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Colman - Agricultural Addresses - 1840

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AGRICULTURAL ADDRESSES
BEFORE THE
CONNECTICUT AGRICULTURAL SOCIETIES
IN 1840,
BY HENRY COLMAN.



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AGRICULTURAL ADDRESSES

DELIVERED AT

NEW HAVEN, NORWICH, AND HARTFORD,

CONNECTICUT,

AT THE COUNTY CATTLE SHOWS,

IN THE YEAR 1840.

BY HENRY COLMAN,

COMMISSIONER OF THE AGRICULTURAL SURVEY OF MASSACHUSETTS.

PUBLISHED BY THE REQUEST OF THE

THREE SOCIETIES.

Boston:

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TO BENJAMIN SILLIMAN, L.L. D.

PROFESSOR OF CHEMISTRY IN THE COLLEGE AT NEW HAVEN, CONN.

AND

Editor of the Journal of Science,

These Addresses are inscribed, as a small testimonial of the highest respect for his eminent learning, his
public spirit, and his distinguished usefulness,

BY HIS FRIEND AND SERVANT,

THE AUTHOR.

Boston, Dec. 1840.

ADDRESS

BEFORE THE

AGRICULTURAL AND HORTICULTURAL SOCIETIES

OF NEW HAVEN COUNTY, SEPT. 33, 1840.

No occasion of the gathering of the people is less liable to objection, or more congenial to benevolent and pious sentiments, than that which has brought us together.

Here, a spirit of good will reigns over the whole. No discordant or hostile feeling can find place. No strife and no emulation can be aroused, but an emulation for excellence, which alike benefits all, and in improvements, which diffuse themselves over the community, and the sole aim of which is the common welfare. To well disposed minds, this is a religious occasion of the highest character. None is more suited to lift up the soul in adoring confidence and gratitude to the great Author of nature. He it is, who "causes grass to grow for cattle, and herbs for the service of man." He clothes the flowers of the field with a splendor, before which the gorgeousness of oriental luxury is dimmed. His benevolent agency operates every where in the teeming earth, the swelling bud, the golden and crimsoned fruit; in the vapor, the dew, the air, the heat, the light, in all their mysterious influences. He is the source of all felicity, health and beauty.

Agriculture is the great art of life. In an economical view it constitutes the subsistence of man. Eating and drinking are deemed vulgar employments; yet who, even among the

exquisite of the transcendental school, is not compelled to conform to the fashion. The body is often spoken of with disdain, as though there were something degrading in its material elements. In such cases, a reflection is cast upon the divine skill and beneficence in one of their most wonderful exhibitions. But is there not an electric chain of sympathy between the body and mind? What is to become of our philosophy without bread and meat? How is genius to speed her flight, or the fires of the imagination to be kept bright, unless this same body, the dwelling place of the etherial guest, be maintained in its health, elasticity, and vigor. It is calculated, that if the harvests of a single year should fail, the whole of the human race must perish. In our latitude, the earth yields nothing unasked and unwooed. All of food and of clothing, all that sustains and protects the body, is the product of agricultural labor in some of its various forms.

Agriculture is the foundation of wealth. The sea renders her tribute; but the earth presents to skill and industry richer and infinitely varied contributions. Money is not wealth. It is only the representative of wealth. Money is coveted because it can command labor; but of what use would it be, if labor would not be commanded. What would it avail to possess all the riches of Potosi, if thereby we could not acquire the products of agriculture? What are manufactures concerned in but these products? What freights the barks of commerce in their liquid flight, threading every channel and whitening every port, but the products of agriculture? Whence does the government derive its revenues but from the fruits of agriculture? What constitutes the wealth of the country but her cotton, hemp, sugar, rice, tobacco, wool, wheat, beef, and pork? Agriculture only can be considered as the creator of wealth. The merchant, the manufacturer, the sailor, the various artisans and tradesmen perform their part in making the products of agriculture more valuable; in transporting them so that the advantages of climate are equalized, and in putting them in a condition for use; but agriculture alone produces. Like the

leader of Israel, she strikes the rock, the waters flow, and a famishing people are satisfied. She supplies, she feeds, she quickens all. Agriculture is the commanding interest of the country, with which no single interest nor indeed all other interests of a secular nature combined, can be brought into competition.

Agriculture deserves the attention of liberal minds as a science. Like many other sciences it is in its infancy. We have broken only the outer crust; but it comprehends the mysteries of philosophy. It involves the whole science of life in the vegetable and animal kingdoms; the miracles of actual production, and the power which man may exercise in modifying vegetable and animal existence. The rearing of a tree, the maturing of a vegetable, the production of a flower, the forming of a race of animals, with shapes, and dispositions, and qualities, modified to a great extent according to your wishes, are in themselves miracles of a power delegated to man, which an intelligent mind recognizes as divine.

Whoever, looking at a dried seed and kernel, considers what it may become, when the plant shall yield bread or the tree spread out its branches loaded with fruit, whoever considers the nature of the life which lies buried in this shell, and reflects upon the combined influences of earth, and air, and moisture, and heat, and cultivation, in their inscrutable operations, all requisite in precise times, quantities, and modes of application, to bring it to perfection, will perceive subjects of inquiry suited to occupy the most gifted intellect. As he approaches this mine of wonders his bosom will pant with an irrepressible curiosity to gain admission into the hiding places of the Divinity, and to quench his burning thirst at the original fountains of power, life, intelligence, and light. Geology, chemistry, botany, all the branches of natural philosophy, natural history, in its diversified departments, animal and vegetable physiology, comparative anatomy, mechanics, meteorology, are all involved in an improved agriculture. The nature of soils has been long a subject of philosophical investigation; and that, with the

application and operation of manures, seems now to be holding in reserve for chemistry its most brilliant triumphs. Do I offend a fastidious ear by a reference to a topic so humble? In looking at the master-piece of human genius in sculpture, the Venus de Medicis, the vulgar mind brings away from the contemplation no higher sentiment than that it is naked. The pure and disciplined mind hardly conscious of this fact, and feeling the responsive movements of the divinity within itself, admires with adoring wonder the triumphs of genius in this sensible imbodiment of the highest beauties of form in the works of the Creator. So it is with other objects in nature, so much depends upon the eye with which we look at them. The vulgar mind, in the heap of manure by the road side, thinks only of its offensiveness and corruption. The well disciplined mind regards it as an element in one of the most affecting miracles of the divine power, and adores that beneficent agency, which, in its mysterious operations, converts this refuse into fruits and flowers.

To consider agriculture as mere servile drudgery is no more doing it justice, than to consider chemistry as only the art of mingling acids and alkalies, and breathing offensive and noxious gases, and handling pots and retorts and crucibles and filters. Let the man of cultivated and philosophical mind approach the subject of agriculture, and he finds "sermons in stones and books in the running streams." Let him engage in its humblest labors, and the same furrow, which is to bear upon its inverted surface the golden grain to nourish his animal life, will produce bread to eat, which common minds know not of, to nourish his intellectual and moral being. There is not one of the natural or what are called the practical sciences, which may not have a bearing upon agriculture. It is with agriculture as in other cases, that mere theory will make no man a farmer. The common processes and the successful execution of the common labors of husbandry can be learned only by practice. He, who would handle a plough well, must have been accustomed to walk in the furrow; as the only safe pilot

is the man who has been practised to stand at the helm. But to think because we have done these things, that therefore we understand agriculture, is as wise as for the man, who should wade up to his ankle through some puddle left by the receding tide upon the sea shore, to pretend that the ocean is not very deep!

The nature and use of soils, the artificial combination of them in different cases so as to effect the largest growth and productiveness, the nature of manures, their uses, application, operations, and infinite varieties, their mechanical influences, and their chemical effects, the varieties of grasses, grains, plants, and fruits, which are or may be cultivated, the habits of vegetables and the propagation of new varieties, the influences of light, and heat, and air, and dew, and rain, and electricity upon vegetation, and how far they may be controlled by human ingenuity or skill, the history and habits of the domestic animals and the modes of rearing them to the highest degree of perfection, the construction of farm implements so as to combine the greatest effects with the least expense of power, the history of agriculture, its condition and improvements at home and abroad, rural labor, rural architecture, agricultural education, the intellectual and moral improvement of the agricultural classes, the connection of agriculture with national wealth, and with its great sisters, manufactures and commerce, and above all, its bearings upon domestic and public happiness, upon domestic and public morals—these topics, among others which might be named, show that agriculture is not destitute, to a philosophic mind, of matters of profound scientific inquiry.

Agriculture, as a pursuit, commends itself to persons of refined taste and sentiment. I know how I shall startle the ear of city fastidiousness by such an assertion; but I rely upon your candor that I shall not offend by the expression of my honest convictions. There is much in the country that is vulgar, rude, and offensive. There is no occasion for this. This is not the fault of the country. But is there more of this in the country than is to be found in cities? These things depend much upon ourselves. The artificial forms of social

intercourse do not prevail in the country as in the town—at least they are not the same ; but it is often delightful to lay aside, at least for a while, the buckram and the starch. I have been through life familiar with all classes of people. I have been many years a citizen in the cities, and a farmer among the farmers. I have been a frequent visiter in city palaces, and many a time an indweller of the humblest mansions in the secluded parts of the country ; and I must say, without derogating from the refinements of the most improved society in the cities, that the comparison in respect to courtesy and civility would not turn out to the disadvantage of the country. True politeness is not matter of mere form or manner, but of sentiment and heart. There are rude and vulgar people everywhere ; but will not a sober judgment pronounce it as great a rudeness to be sent knowingly away from the door of one who calls herself a friend by a servant with a lie put in his mouth, as to be received by the kind woman who welcomes us heartily at her wash-tub or her spinning-wheel, and sweeps a place for us without apology to sit down at her kitchen fire. You will pardon the homeliness of my illustrations. You may thread your beautiful valley from the ocean to the mountains ; you may, as I have done, follow the silver stream, whose honored name is borne by your Commonwealth, from the place where it deposits its contributions in the mighty treasury of the sea, to its gushing sources under the snow-clad summits of the north, and traverse every State whose borders are laved by its gentle waters, and good manners on your part will be invariably met with a corresponding civility. Excepting among the vicious and depraved, you will find no rudeness unless you are so unfortunate as to provoke it by your own arrogance.

It is folly to carry city manners and customs into the country. This destroys the simplicity which constitutes the charm of rural life. If you have no real taste for rural pleasures, no interest in rural concerns, no disposition for rural labors ; if you are afraid of soiling your hands or browning your cheeks ; if you can make no friends with the flocks that whiten the

fields, nor the birds that make the hills and forests vocal with melody ; if you are unwilling that the earliest rays of the dawn should disturb your repose, and your heart kindles with no enthusiasm in the golden sunset, then flee the country as you would the Siberian desert. It would be to you only a land of discomfort and solitude.

But it is otherwise with many minds. Agriculture and horticulture, far from being disdained, have been of all others, the chosen pursuits, the purest delights of some of the most enlightened and gifted intellects ; and their enthusiasm in these pursuits burnt with increasing intensity to the close of life. From the turmoils of war, the struggles of political ambition, the harassing pursuits of successful trade, the busiest scenes of life, from the forum, the senate, and the throne, they have retired gladly to the humble occupations and pleasures of rural life and labor, and have found the precious gem, which they had so long sought, only in this calm philosophy of nature.

The country is the land of poetry and the home of the winged imagination, as much as it is the home of the birds. The charms of the country are unconsciously acknowledged even in cities, when you see how they, who live in cities, love to get a grass plat, though not larger than a handkerchief, before their doors ; or train a woodbine or a honeysuckle to their piazzas ; or crowd their windows with flowers ; or adorn their persons with a floral wreath. The first offerings of the muses were dedicated to rural life. In the waving of the golden harvest, in the verdant lawn spreading its smooth carpet beneath your feet, in the prairie ocean of verdure radiant with the richest gems of floral beauty, in the deep and solemn forest, in the mirrored lake reflecting in perfect distinctness the mingled beauties of forests and skies, in the flowing river an image of eternity, in the mountain lifting its crested top above the clouds, in the boundless horizon, in the reddening dawn, in the gorgeousness of a summer's sunset, in the mingled splendors of the autumnal forest, there is every thing to kindle the imagination and dilate the heart. When in the advancing spring

the man of reflecting mind and cultivated taste, at break of day, witnesses the waking up of creation, beholds the desolation of winter rapidly retiring before the empire of spring, and sees day after day, almost from hour to hour, new forms of vegetable and animal life starting into existence, and rioting in the consciousness of life, it requires no violent effort of the imagination to behold a new Eden rising before him, and to hear the chorus of the morning stars, and "the sons of God shouting for joy."

In speaking of the moral aspects of agriculture, I shall make no invidious comparisons. The country presents as few temptations to vicious indulgence as any condition in life; perhaps it may be said, fewer temptations. Agricultural labor, unless pursued to an excess, so far from being exhausting and destructive like much other labor, is friendly to health, and favorable to intellectual vigor and length of life. The domestic ties seem stronger in the country than in the city, because we are more dependant on each other, and have fewer objects to engross our attention. Human life seems more valued in the country than in the city. In a crowded city men drop out of the stream, and the vacancy is instantly filled up by the rushing torrent, and scarcely produces in the spectators a conscious emotion. When a valuable man dies in the country, the whole village mourns the blow. There is more of real kindness and benevolent sympathy in the country than in cities. The cities are full of magnificent charities; the country is full of the charity of kind offices. In the country, is a neighbor sick or afflicted, the whole neighborhood are prompt to visit him, to aid him by personal service, and to watch night after night at his sick bed. In cities it cannot be so. Cities present some of the most bitter cases of friendlessness to be found in human history. Persons suffer, and sicken, and die, without perhaps the cognisance of those living under the same roof and on the same floor. In the country personal character has a higher value than in cities. In cities everything is absorbed in the great whirl of business or pleasure; and in

crowds, presenting every variety of character as of costume, men pass along without observation. In the country every man is known, observed, and watched. His character seems the common property of the village. This is sometimes complained of in the country as impertinence and intrusiveness. This may sometimes be the case, and it may become annoying; but it is not so frequent as the complaint of it. That it has a favorable influence upon good morals which, under the weakness of human nature, need every security, there can be no doubt.

In the healthful labors of the country, the early hours, the simple diet, in the open air, in the virtuous restraints, in the general good morals which prevail, in the strong sympathy and mutual interest in each other's character and welfare, which bind such communities together, in the absence of multiplied temptations and facilities of vice, which prevail in more populous communities, an agricultural life is highly favorable to virtue.

I hope I shall be excused for dwelling so long upon the advantages of agricultural and rural life. Agriculture has been too long denied the rank which belongs to it among the pursuits of mankind. I would exert what humble abilities I possess to place it in its true position among the liberal and humane arts, and to show its importance. I would speak of it as one of the highest pursuits of philosophy. I would gladly commend it to persons of refined sentiment, as abounding in scenes, objects, and associations, full of gratification to the most cultivated mind; and for its moral securities and moral influences, it needs no recommendation in a community like yours, presenting in its beautiful villages, among its swelling hills, and its richly cultivated vales, in the character of its rural population, such emphatical demonstrations of improved education, of correct morals, and of the best influences of religion.

I have barely glanced at these topics, because I would not encroach upon your indulgence. I have done this with the more earnestness because the tendency of our young people,

impelled by avarice or by false views of happiness, has been to forsake the wholesome pursuits of agriculture, where they found health, competence, and a manly independence, for occupations in the cities, oftentimes of the most servile character ; degrading to their self-respect, corrupting to their passions, and proving often the grave of their virtue. Our cities likewise are crowded with young men of professional education, who, with hearts aching from hopes deferred, linger along from year to year until the health is exhausted, habits of indolence are induced and confirmed, and the best portion of life is wasted away without the accomplishment of any valuable object ; or the enjoyment of those domestic ties, in which Heaven designed that man should find the strongest security of virtue and the purest fountains of happiness.

I would gladly likewise commend this subject to another class of individuals, whose attention I fear, however, I shall bespeak in vain. Whoever visits our great cities is constantly struck with amazement at the enormous expense and splendor of many of the private residences ; at the extravagant piles of brick and stone, seldom half tenanted, and adapted to real comfort and convenience in an inverse ratio to their inordinate size and their wasteful magnificence. I would seldom, indeed, advise a person, accustomed through the prime and middle of life to the excitements of business, politics, amusements, and general society in the cities, to go at once into the seclusion of the country, especially at that period of life when the vital current becomes sluggish and the physical powers lose their wonted energies ; but it is not difficult for such men, when their fortunes are made, to enjoy the advantages of the city and the country together. Let them pass, if they please, their winters in the city ; but what immense benefactions might they confer upon society, and what sources of agreeable and useful occupation might they find for themselves, if, instead of expending their fifties or their hundreds of thousands on a brick or stone castle in the city, which they have seldom the means of enabling their children to occupy, and which must

therefore, in the course of nature, soon change hands, they would expend some three fourths of that sum in subduing, cultivating, and improving some hundreds of acres in the country, rendering them productive, and planting upon them industrious families. They would breathe into the heart of their benefactors, the purest of pleasures in welcoming them, whenever they came among them, as their best friends. This seems one of the most useful, as it is certainly one of the most innocent purposes to which wealth can be applied.

But I must pass to other topics. The next question then, which arises in this case, is whether agriculture can be made profitable; and especially whether it can be made profitable in New England? This is a great question. I can only reply briefly, without going into the various illustrations which might be presented. I will here express my thorough disgust for that inordinate and grovelling avarice, which can find no good but in the accumulation of mere dollars and cents. Wealth is to be valued for its uses not for its amount; and a philanthropist can look only with sorrow and alarm upon that heartless and frenzied spirit of accumulation, which at one time, like a terrible epidemic, threatened to lay waste all principle and honor, and to render contentment, competence, and reasonable and moderate desires, matters of pure romance, which we had somewhere read of in our childhood. By the righteous laws of Divine Providence, that inordinate thirst for gain without industry, temperance, or frugality, has been so signally rebuked, that it will not again immediately show itself. There may still be the appearance of life in its quivering limbs, but few will have courage or power to attempt its resuscitation.

In the southern portions of our country, favored for the purpose by its peculiar climate and soil, we hear of agricultural returns in their great staples, which confound the humble calculations to which we in New England are accustomed. Yet there are abatements in the case, in the perils to health, and in the nature of the labor by which these products are procured, which, save where the heart is cankered with avarice and

inhumanity, at once relieve a New England man of all envy of such success. The fact likewise presents itself in the case, strange as the anomaly may seem, that the southern planters are not richer than the northern farmers ; they have not so many of the real comforts of life. Many a New England farmer is more independent with his income of a few hundreds, than the southern master of his uncounted acres and his hundreds of slaves, with his income of many thousands. I do not say these things in the spirit of invidious comparisons ; I would not mar the pleasures of the occasion by awakening a single unkind feeling. But we may learn, from the facts in the case, a lesson of gratitude, that we are permitted to breathe the bracing air of northern mountains and seas, and the still more invigorating atmosphere of equality of condition and universal freedom.

Agriculture in New England presents no brilliant prizes to the mind bent solely upon the accumulation of wealth. Yet rough, barren, and inhospitable as New England seems to many persons, yet I can show you, in every town from Lake Champlain to the Aroostook, and from Saybrook to the Canada line, not a few examples of men, who by farming have maintained their families in health and comfort, educated their children well, and, if so they pleased, found the means of sending one or more sons to college ; exercised, as far as they had occasion, an unstinted hospitality ; contributed their full share of the public dues, and are now enjoying the evening of life with an honest conscience and a competence for every reasonable want. The house, in such case, may appear moss-covered and brown with age. No burnished lamps light up its halls, and no carpet soft as down cover its floors ; but infinitely preferable is such a dwelling to palaces, where once wealth, the product of defrauded labor, illuminated every room, and revelry and luxury held their frequent courts ; and where now, though bankruptcy has long since entered, men are still living upon the fragments of former luxury or upon hoarded gains, in defiance of justice and honor.

Further, my inquiries have satisfied me, that there is not a single crop well cultivated in New England, which in ordinary seasons will not pay a fair rent of the land at current prices, and liberally compensate the labor and cultivation. Our proximity to quick markets gives us great advantages over many parts of the country. In one of my visits to a town on the sea shore of Massachusetts, in a region whose rock-bound surface seemed to set cultivation at defiance, I found several acres of land subdued and improved at the rate of three hundred dollars per acre. Could this be afforded? Look at the case. The land was made to produce three tons of hay to the acre. The price of hay in the vicinity has averaged for years, at least fifteen dollars. The value of one ton of hay per year, is sufficient to gather the crop and keep the land in condition. Thirty dollars then are the net return for the investment. These are examples of extraordinary expenditures and ample profits. The crop of Indian corn is the great blessing of our country. The average crop in New England is thirty bushels. It is not difficult to produce fifty to an acre. I have known one hundred and eleven produced on an acre in Massachusetts, as measured after being shelled and dried. At fifty bushels per acre, rating the rough fodder as equal to a ton of English hay, and the grain at seventy cents per bushel, the return may be considered as equal to fifty dollars. Thirty dollars may be considered as a high average cost of cultivation, and this including the interest upon the value of the land at fifty dollars per acre.

I have lately returned from a visit to the far West; from the Illinois prairies, beautiful and fertile beyond all description. This land has been to be had almost for the asking. I am not disposed to underrate any of the advantages of this land of promise, farther than to say, that I am more than ever satisfied with New England. The boast of this western country is that the crops require no manuring and little cultivation. Under present circumstances, the land, allowing the enclosure to be such as to require only twenty rods of fence to an acre,

cannot be fenced with a worm fence under six dollars an acre. This is to be added to the cost of the land. The first year's breaking up, when in general no return of any value is obtained, is done at an expense of two dollars and a half per acre. This, likewise, is to be added to the cost of the land. We come now to the second year, when it is to be ploughed at an expense of two dollars and a half or two dollars per acre; the corn is to be planted and covered; it is to be harrowed with a cultivator at least three times, which at current prices of labor cannot be estimated at less than two dollars; and it must be gathered, and husked, and cribbed at an expense I leave you to estimate. The rough fodder is deemed of no value. The crop ordinarily will not exceed forty bushels, but sometimes rises to fifty. Place it at fifty. The present price varies from fifteen to twenty cents. It can scarcely ever be expected to rise above twenty-five cents. This would give a return of twelve and a half dollars to the acre, out of which you must deduct at least seven dollars for the cultivation. This certainly is not to be compared with our New England profits, as far as this branch of husbandry is concerned. Labor must continue to be high in the Western States. Cheap land will make high wages. I have not time to consider other branches of husbandry in the West.

One of the products of New England is fine wool. In localities adapted to this product, where three pounds are obtained to a fleece, and land for pasturage is at a reasonable price, wool will pay a fair profit at thirty-seven and a half cents per pound. It may often be produced at thirty. We consider of course, in the case, the increase of the flock. The dairy produce in the best districts of New England is nowhere surpassed in amount. The ordinary product of a cow may be rated at 250 lbs. of new milk cheese, and 25 lbs. of butter a year. This is a yield with which no farmer should be satisfied. The returns of the best dairies in England and Scotland, give an average of 500 lbs. of new milk cheese to a cow. This is admitted to be an extraordinary yield. The

returns of some dairies in Berkshire County, in Massachusetts, give an average of more than 500 lbs. of new milk cheese, and in one case of 627 lbs.; in another case, of 632 lbs. to a cow; and in this latter instance, from eighteen cows, yielding this amount of cheese, 200 lbs. of butter were produced the same season and 1700 lbs. of pork were fattened, half of which was to be credited to the dairy.

Of hay in New England, I have known more than 29 tons of well made hay, every load weighed under oath at the public scales, taken in a year from 6 acres of land, and 120 tons from 40 acres. Of potatoes, more than 600 bushels have been repeatedly produced; of ruta бага, 900 bushels; of mangel wurtzel, more than 1600; of carrots, more than 1300, and in one instance at the rate of 1784 bushels to the acre; of broom-corn, more than 1000 pounds of brush; of rye, more than 40 bushels; of wheat, more than 35; and of oats, 100 bushels to the acre, and upwards of 90 bushels to the acre on a field of several acres. No person will suppose that I mention these as ordinary crops; they are very extraordinary crops. But as they rest upon indubitable evidence, we have a right to refer to them as showing what may be done. There is no more powerful stimulant to exertion and enterprise, than the well established success of others placed in circumstances not differing from our own.

New England has, in a great measure, despaired of producing its own wheat; but, in my opinion, there is no occasion for such despair. Several farmers in Massachusetts have produced their own wheaten bread for years. Their crops average more than twenty-five bushels to the acre, and they regard their wheat crop ordinarily as successful as any which they raise. I believe the secret of success in the cultivation of wheat in our soil has been disclosed—that it mainly consists in the selection of a pure seed, in cleanness of cultivation, and especially in furnishing a new and well prepared soil for the plant; but as I have gone fully into this subject in my official reports, which are before the public, I forbear to tres-

pass upon your indulgence by their repetition. I do not regard the soil or climate of New England as particularly favorable for wheat ; but the crop, with due pains, may be grown on most of our farms to advantage, and ought to have its place in a judicious rotation. I will not go more into detail. These statements show that agriculture, when pursued with the light of the best improvements of the age, is not, even in New England, to be disdained, but may yield an ample return for enlightened, frugal, and judiciously applied labor. If agriculture, therefore, in New England, will give us a fair compensation for labor, and if to this we may add health, peace of mind, and humble competence, what more can a reasonable mind ask ?

The long winters of New England are often complained of. But let us look at this. The season of cultivation is long enough for the maturing and perfection of all the vegetable products which the climate and soil are capable of producing ; and these embrace an abundance and profusion of the most valuable grains, grasses, vegetables, and fruits, for the whole year. The temperature is favorable to labor. The long winters bring with them opportunities of social intercourse of the most delightful character. While the bracing air of winter gives elasticity to the muscles and vigor to the mind, it affords, in its leisure from out-door labor, the most favorable opportunities for intellectual improvement. The farmer, in this respect, has advantages which fall to the lot of few other conditions of life. Happy is it for him, when an enlarged education and a taste for books and scientific inquiries enables him to improve them to the greatest advantage. Under these circumstances, no condition in life, to a man of reasonable desires, whose heart is not poisoned by avarice or ambition, seems more privileged or more enviable.

I have said that agriculture as an art, is as yet imperfectly understood. But it is encouraging to contemplate the improvements which have been made in it within the last half or even quarter of a century, and the rapidity which it is still advancing.

In the introduction of improved stock, and particularly of sheep and swine, millions have been added to the wealth of the country. In the introduction of improved implements an immense gain to labor has been accomplished. Take the great instrument of husbandry, and compare an improved modern cast-iron plough with the best instrument of thirty years ago, in the lightness of its form and the philosophy of its construction, in the perfection of its work, the facilities of its repairs, and the easiness of its draught, and you may date from its introduction almost a new era in husbandry. Compare the cradle with the sickle, and the elastic pitchfork with the stiff and clumsy instrument formerly in use, and you will perceive with how much more ease than formerly some of the hardest labors of husbandry are now performed. One of the greatest improvements in modern husbandry has yet to be introduced into this country, and that is the subsoil plough, and especially in its connection with an improved system of draining. This is already effecting a great revolution in British husbandry, and may be in many cases adapted to our cultivation. It will be said that expensive improvements are not suited to our country. This objection is best answered by experiment. This is the only mode by which the question can be settled. Let these experiments be tried upon a small scale, and if they actually become profitable, this will determine the expediency of their introduction. I should be among the last persons to recommend the indiscriminate adoption of all that are called improvements, and especially in countries whose circumstances essentially differ from the circumstances of our own country; but it would be a greater folly to reject all well attested experiments without inquiry or trial. This improvement in England has actually doubled the products. Other improvements are fast going on in our country; and under the liberal patronage of several of the States, geology and chemistry are rendering the most valuable aids to agriculture. I shall be pardoned for saying, I know not where their services can be more properly bestowed; and I can but hope the public spirited

example of several of the States, will be followed with an equal liberality by other States. The time, I hope, is not distant, when to these means of improvement will be added the establishment of professorships of agriculture in all our colleges; that this most important art may have its proper place in every system of liberal education. The omen of our times, perhaps, most auspicious to agricultural improvement, is in the spirit of inquiry every where awake, and fostered by the publications which the press pours out in profusion. It requires, indeed, no small practical skill to separate the chaff from the wheat; but inquiry cannot be otherwise than useful, and experiments which fail, if faithfully detailed, are often as instructive as those which succeed.

The introduction of new articles of culture promises to be of great importance. Silk is not a new article of culture in your State, but a fresh impetus has been given to it by the introduction of new and valuable plants for the sustenance of the worms. I have encouraged none of the extravagant calculations of visionary minds in regard to this product; but the most disinterested inquiries made in various parts of the country satisfy me that the cultivation of silk must succeed among us, and will prove a source of reasonable profit, when pursued by New England care and skill, as a collateral branch of husbandry and of household industry.

In the introduction of manufactures of cotton and wool by water and steam, long accustomed objects of household industry have been abolished. The culture of silk promises a desired substitute, likely to furnish employment with ample compensation; and especially enabling our daughters to supply their own personal wants, and to enjoy the advantages and securities of the paternal roof. There is with some persons, a fastidiousness which shrinks from the touch of a reptile, odious and offensive, as many, through a false education, are disposed to regard all reptiles. This is mere prejudice and folly. A little good sense and familiarity will soon overcome all such feelings, in the case of an insect so interesting in all his habits

and so wonderful in his transformations as the silk worm. Strange, it seems, that those who are ambitious to adorn themselves with his cast-off garments should be disdainful of his acquaintance. No animal is more harmless; and the reflecting mind cannot fail to recognize in him the miracles of Divine Providence.

At his entrance into life, we see him among the smallest living existences, within the cognizance of our senses. In six weeks, at farthest, he completes his work; and by his humble and unobtrusive labors, contributes largely to the clothing of mankind, and creates, yearly, millions and millions of wealth. It would be curious to calculate the hands he employs, the mouths he feeds, the wheels he sets in motion, the ships he loads, and the vast riches to which his annual labors amount. This reads a striking lesson to the reflecting mind, on the immense results which spring from regular and combined, though minute and often disdained labor. Nor are his changes the less striking to the thoughtful mind. Nature is full of mysterious transformations which show that the power of death has its limits, and indicate the wonderful progress of animated existence. Having accomplished his appointed task he wraps himself in his silken shroud; but with him death is only a transient sleep. If left to himself he soon emerges from his tomb no longer a reptile but a winged chrysalis, to enjoy another existence. In the curious transformations of this humble insect, man may see an instructive indication and testimony of the progress of being, and a proof that death is not annihilation. May we exult in the hopes gathered from such beautiful examples in nature, and confirmed by divine revelation, that with man also, death is only a translation into life; and that for him to burst these cerements of the grave is not, like the silk worm, to pass rapidly through another form of being, but to enter upon an immortality.

Among the interesting exhibitions of this occasion, Horticulture and Floriculture have presented their liberal contributions. In the variety and perfection of Indian corn, esculent vegeta-

bles, and many of the fruits, the exhibition cannot be surpassed in the country; within my observation it has never been equalled. In such a profusion of the most nutritious vegetables, and the most valuable fruits, we see every reason to be satisfied with our local condition. If peculiar obstacles to their cultivation present themselves in the soil or climate of New England, we may with an honest pride congratulate ourselves upon that industry and skill, which in defiance of such obstacles, successfully produces them in abundance and perfection.

Flora, likewise, on this charming occasion, holds her court among you, adorned with more than oriental splendor. In the two great floral kingdoms of nature, the botanical and the human, if we must yield the palm to that which is alike transcendent in the beauty of form and motion, and in the higher attributes of intelligence, innocence, and moral perfection, yet it can be no derogation to admire, with a rapture bordering upon enthusiasm, the splendid products of the garden; and especially when their beauties are combined and arranged, as on this occasion, with an exquisite and refined taste. What is the heart made of which can find no sentiment in flowers? In some of the most striking displays of this occasion, in the dahlias for example, we see what can be done by human skill and art in educating and training a simple and despised plant, scarcely thought worthy of cultivation, to the highest rank in gaiety and glory and ever varying perfection in the aristocracy of flowers. We may learn from such success a lesson of encouragement in the education and training of flowers of an infinitely higher value and perfection.

The vast creation of God, the centre and source of good, is every where radiant with beauty. From the shell that lies buried at the depths of the ocean to the twinkling star that floats in the still more profound depths of the firmament, through all the forms of material and animated existence, beauty, beauty, beauty prevails. In the floral kingdom it appears in an infinite variety, in an unstinted and even a richer profusion

than in other departments of nature. While these contributions are thrown out so lavishly at our feet, and a taste for flowers seems almost an instinct of nature, and is one of the most innocent and refined sentiments which we can cultivate, let us indulge and gratify it to the utmost extent, wherever leisure, opportunity, and fortune give us the means. There is no danger of an excess, under those reasonable restrictions, which all our sentiments demand. "But," says some cynical objector, "flowers are only to please the eye." And why should not the eye be pleased? What sense may be more innocently gratified? They are among the most simple, and at the same time among the cheapest luxuries in which we can indulge.

The taste for flowers, every where increasing among us, is an omen for good. Let us adorn our parlors, doorways, yards, and roadsides, with trees, and shrubs, and flowers. What a delight do they give to the passer-by? What favorable impressions do they at once excite towards those who cultivate them for their own gratification, and find, after all, their chief pleasure in the gratification which they afford to others. What an affecting charm, associated as it is with some of the best sentiments of our nature, do they give to the sad dwelling places of the departed and beloved.

The moral influences of such embellishments deserve our consideration. I do not mean simply the substitution of such refined tastes and pursuits, in place of the gratification of the lower appetites. This is no small matter. But another influence should not be overlooked.

Every one familiar with human life must be sensible that mere personal neatness and order, are themselves securities of virtue. As we cultivate these habits, and in respect to our residences and the things and objects around us, make a study of rendering them orderly and beautiful, and of adding to them the highest embellishments of art, our own self-respect is greatly increased. Next to religious principle nothing operates

more than self-respect, as a safeguard of virtue and a stimulant to excellence.

The direct tendency of all such embellishments in our grounds and habitations is to multiply the attractions of home, and to strengthen the domestic ties. It is the glory of New England, that these precious ties are no where stronger or more sacred. I would bind her children, if possible, by chains a thousand times more enduring. In all my journeyings into other lands, favored as they may be by the highest advantages of climate and soil, I come back to New England with all the enthusiasm of a first love, and a filial affection which, if possible, has only gained new strength from absence. Indeed, there is every thing in her to love and honor. Let us seek to render every spot of her rude territory beautiful. To the eminent picturesqueness of her natural scenery, adding the triumphs of an industrious, and skilful, and tasteful cultivation, every substantial want of our nature will be supplied, every refined sentiment of the mind gratified; and the true New England heart will ask no other Eden this side of that better country where flowers bloom with a radiance which never fades, and "one unbounded and eternal spring encircles all."

AN ADDRESS

DELIVERED AT

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OF NEW LONDON AND WINDHAM COUNTIES, CT.

THE agriculture of New England is the subject, which I propose on this occasion to discuss. Various inquiries at once present themselves to our attention. Are its soil and climate adapted to agriculture? Do the condition and circumstances of its inhabitants recommend it? May the pursuit in New England be rendered productive and profitable? What branches of agriculture may be most advantageously pursued in New England? These questions I will try to answer. Of necessity the answer must be brief and imperfect; but it shall be the answer not of conjecture merely, but of facts, experience, and personal observation.

New England contains a fair proportion of soil capable of producing all the crops necessary to human subsistence and comfort, and to a degree which affords an adequate compensation to labor. New England possesses a great variety of soil, and it would be difficult to find much absolutely worthless. On the other hand, she has a great deal that is highly fertile and productive.

There are large tracts of a peculiar soil eminently adapted to improvement in itself, and to the enriching and improvement

of other soils, the value of which has scarcely begun to be appreciated. I refer especially to our peat swamps. These are deep deposits of vegetable matter, the accumulation of ages, which, in many cases at an expense which one year's cropping will compensate, may be made in the highest degree productive in grass, potatoes, carrots, and Swedish turnips, and in some cases, as experiment has proved, in corn, rye, and wheat. Three tons of English hay per acre are not an unusual crop to be obtained from these lands, and by proper management their productiveness seems almost inexhaustible. I will set aside altogether their value as fuel, though in this respect, within twenty-five miles of a large city, they must be considered at current prices of fuel as of very great worth per acre. After two spits of fuel have been taken, the land is still of considerable value to the owner; and if the top-paring, which is unsuitable for fuel, be thrown back, it will in two years afford him a liberal cutting of good fodder for his stock. But besides all this, the importance of these grounds, as furnishing abundant resources for his compost heap, and enabling him to enrich his higher and perhaps exhausted grounds, is incalculable. Now the amount of this soil in New England is probably much beyond what most persons would suppose. The island of Nantucket, for example, is calculated to contain 985 acres of peat swamp, from one to fourteen feet in depth, which is almost a tenth of its whole territory; and excluding the four western counties of Massachusetts, which abound less in this kind of soil than its eastern portion, it is calculated that there are at least 80,000 acres or 125 square miles of an average depth of six feet four inches within this single state. Whether, then, we consider the value of this soil in itself for cultivation, or as furnishing the ready means of restoring that, which has been exhausted, we cannot but acknowledge the advantages which it promises to our agriculture.

Of the quality of the soils in New England the best test is their actual productions. What has been done will show what can be done. The average yield, if we take in the whole State,

of our cultivated lands, and of our dairy management, is small; and is often spoken of with disdain by those who have planted themselves upon the untouched alluvions of the great Western rivers. Let us see, however, what it is and what it can be.

With our present husbandry in New England, the average crop of Indian corn does not exceed 30 bushels to the acre; of wheat, not more than 12; of rye, not more than 10; of barley, not more than 20; of oats, not more than 25; and of potatoes, not more than 150 bushels to the acre. But it will not be just by any such results to determine the capacities of our soil. These small products do not prove the inferior character of our soil, so much as the low character of our husbandry.

In order to determine what can be done, we may refer to what has been done. One hundred bushels of Indian corn have been repeatedly produced upon an acre of ground in New England. This statement will be heard by many with incredulity. There are persons who are determined against believing that any thing can be done, which they have not themselves accomplished. Their incredulity, however, though it may satisfy themselves, does not affect the facts in the case. Now I mean to assert, that in Plymouth County, Massachusetts, one hundred and ten bushels of Indian corn have been raised upon an acre, and the measurement of the crop was made after the corn was shelled, in the March following the year when it was grown. Of wheat, in many cases, 30, 35, 40, and in one case 55 bushels have been produced upon an acre. Of rye, more than 40; of barley, 50; of oats, 100; and of potatoes, more than 600; of onions, 800; of Swedish turnips, 900; of carrots, 1000 and 1200 bushels. Of hay, under good management, three tons to the acre is not uncommon; and I have known four tons to the acre to have been actually weighed from a lot of several acres; and one case, in which a lot of six acres produced at the scales of well made hay upwards of 29 tons. We have much land in New England capable of being made to do as well; and industry, skill, and enterprise, are all that is wanting to effect it.

The next question respects the climate of New England. There is nothing in the climate of New England which forbids or is unfavorable to the prosecution of a successful agriculture. The winters in most parts of New England are long ; and cattle are kept at the barn from six to seven months. But if the season of repose is long, the season of labor and toil is proportionately short. With us, though it be reduced to five months, it is long enough to make ample provision for the winter that is to follow. In a northern climate vegetation is accelerated in proportion to the shortness of the season of life and growth ; and nature accommodates herself to her necessities. There are extremes of temperature, which most persons would be glad to avoid. If New England does not occupy the desirable medium, yet it will be allowed that her climate is not surpassed by any in respect to longevity ; and our winter seasons are universally acknowledged to be favorable to health and to mental vigor. In most parts of New England, the climate allows of the maturing of the most delicious fruits ; and there are few portions, excepting the most northerly, of her whole territory, where Indian corn may not be matured. For twenty-four years in succession there has been but a single general failure of the crop of Indian corn. This, though extensive, was not universal ; and this might have been in a great measure avoided, had suitable pains been taken in the procuring of the earliest seed and the proper management of the land. With the exception of cotton, rice, tea, and the sugar cane, there is not a single great and valuable agricultural product which may not be successfully cultivated in her territory.

The next inquiry, which suggest itself, is whether we have the means of enriching our soils and of rendering them as productive as they may be made. We have first, then, the usual supply of animal manure ; and as we are not exporters but are importers of agricultural produce to a considerable extent, this being consumed among us, performs its part in restoring what has been taken from the soil, and in further increasing its productiveness.

Further, in extraneous manures we are by no means deficient. I have already spoken of our peat swamps, and of the vast deposits of this vegetable matter, which are scattered over our territory. Several parts of our territory abound in limestone and in calcareous marls, which it is hoped will prove ultimately of great value. Our sea coasts present an inexhaustible supply of sea-weeds and fish, and of marsh and dock mud, and muscle bed. Of ashes in various forms we have the usual supplies. Many of our various manufactories furnish directly valuable manures or materials for manure. This may be said, in particular, of our woollen manufactories; comb and brush manufactories; sugar refineries; extensive tanneries; soap factories; oil and candle establishments; glue factories; and slaughter-houses. Our large cities and villages furnish the usual resources for manures to the neighboring towns. Many of our lands, likewise, are sensitive to the almost miraculous powers of gypsum; and though New England has within itself no considerable deposits of this valuable mineral, yet it is easily procured, and may be furnished to every part of the Commonwealth at a reasonable expense;—an expense in no case, where its efficacy is ascertained, such as to discourage its use.

We have made as yet, small advances in the art of saving and compounding manures. There is little doubt that as much valuable manure is now lost or thrown away, through ignorance or neglect, as is used. The practice of renovating and enriching land by ploughing in green crops, or by inverting the old sward, is seldom practised among us, although where this has been done, the effects have surpassed the most sanguine anticipations. The introduction of bone manure and poudrette, is likewise recent; but from their proved efficacy and the facility of their transportation, they are likely to prove extraordinarily beneficial. In New Jersey, I have witnessed the most remarkable effects of a newly discovered marl, of an alkaline character, and of great efficacy. It has more than doubled the value of lands in the neighborhood of the pits where it is found.

The application of one hundred bushels of this marl to land, which under common cultivation would produce not more than 20 bushels of corn to the acre, causes it to yield 60 bushels ; and wheat and clover in proportional abundance. Nor are its effects transient, but it produces a permanent improvement of the soil, the duration of which is not yet ascertained. In this respect it differs most favorably from ashes and many other manures, whose efficacy is continued seldom more than one or two years. At present this marl is delivered at the pits at seven cents per bushel, and might be delivered at many of the ports of New Jersey at a small advance upon that price. The farmers of Long Island have for years been in the habit of purchasing for their wheat fields our leached ashes at a cost of ten and twelve cents per bushel. If these shrewd farmers have then found an advantage in coming to our ports after our drawn ashes, why may not we import marl from New Jersey,—a substance far more efficacious and more enduring in its effects than ashes, at even a less price than is paid for our ashes?

I shall not say any thing on this occasion of the unappreciated value of liquid manures, because I have already, in writing and speech, urged the agricultural public very much upon this subject ; but experiments are greatly wanting in our community on the application of manures generally, as far as is practicable, in a liquid form. This is a favorite practice among the Flemish farmers ; and its pretended advantages, and the practice of cultivators so eminent for their skill and success as these farmers, must presently induce a fair trial of it among our own farmers,—a trial from which I think great benefits are likely to result.

In regard then to manures and the means of enriching our lands in New England, there is no deficiency ;—but we are greatly wanting throughout the State, in frugality to save the vast amounts which are now wasted ; in industry to collect the means around us ; and in skill and labor in preparing them

for use. In soil, climate, and manures, there is no impediment in New England to a successful agriculture.

Our next inquiry is, whether the condition and circumstances of our people favor the pursuit. I shall avoid all general considerations in this case, because they would carry me too far, and I desire that my remarks should have as practical a bearing as I can give them.

I have no disposition to indulge in any self-glorification. We have so much of that from all quarters, that it is offensive to sober and well disciplined minds. I wish to institute no invidious comparisons between our own and the people of other communities. It is, however, only simple justice to say, that the people of New England, as a community, are intelligent, temperate, industrious, and frugal. We have ignorance, drunkenness, idleness, and extravagance enough. Indeed, in having any we have too much; but the general character of our community is what I have described; and intelligence, temperance, industry, and economy, are the great elements of success in all the laborious pursuits of life; in none more so than in agriculture.

Our climate is, as I have remarked, favorable to labor. The severe and relaxing heats of summer are of short duration, and seldom of such intensity, as that moderate labor is not in truth a refreshment. The elasticity of our autumnal and winter atmosphere induces to activity, and renders muscular exertion a pleasure. A day in the very depth of winter, spent in collecting wood in the unbroken silence of the leafless forest, with a deep bed of snow under your feet; the battling through the day with a drifting northeast snow storm, bristling with crystals of ice, or the beating your way and opening a sort of subterranean passage through the piled-up waves of snow, which sometimes fill up our roads, to the well clad and well fed are often days of as healthful and agreeable an excitement, as far as mere physical pleasure is concerned, as are ever enjoyed by the more favored children of luxury and indolence in the elysian fields of the tropical zone.

The condition of our people, too, is such, that labor is indispensable to their subsistence. Few persons among us are raised above its necessity. A large proportion of the people of New England are compelled to depend wholly upon their own exertions; and come into the world like men thrown into a stream, who must swim to the shore or perish. From their childhood, therefore, they are trained to labor, to self-dependence, and to exertion. They are not, therefore, indisposed to labor; and this habit of relying upon themselves is the best foundation for success in any pursuit, whether of a physical or intellectual nature.

Commercial and manufacturing pursuits withdraw a large portion of our people from agricultural labor, as they promise higher wages and ready money. It has been supposed, and confidently maintained among us, that manufactures, especially, would operate as an encouragement to agriculture, by creating a quick market for its products in the villages, which spring up wherever these establishments are planted. But the effect has been to withdraw a large amount of labor from the farm, and render it difficult and discouraging, through the scarcity and consequent high prices of labor, to carry on, to any considerable extent, and with any enterprise, the business of the farm. Perhaps we are not yet sufficiently populous, to furnish an ample supply of labor to our farms, and the extensive manufacturing and commercial establishments, which are in operation among us. As our population advances, we shall have people enough, for all the departments; but, hitherto, trade and manufactures as carried on among us, have operated, in some respects, to the hindrance of agriculture; and I shall be forgiven, I hope, in expressing my mortification and regret, in observing the crowds of young men in our cities, who, instead of brightening their hoes, and standing behind their ploughs, prefer to rub the brass bell knobs, and stand behind the tables; or, else, with the muscles of oak, made to breast the wind, to turn up the soil, and to gather the harvest, choose, in their miserable effeminacy, to thrust themselves into woman's sphere, and putting on the dandy's uniform,

become transformed into a sort of gum-elastic exquisites, to stand behind counters, and measure our pins and ribbons. Still more is it to be lamented, that now in the country, the milk-maid's elastic step, and neatly tied up locks, and ruddy cheeks, and sparkling teeth, is a picture to be found only in the lumber garret of some secluded antiquarian, who, poor soul ! has never heard of the *Mirror of Fashion*, or the *Lady's Magazine*.

These things have operated, in a great degree, to the hindrance of agriculture ; and, for this reason, many cultivated lands in the State, have been abandoned to wood ; and dairy establishments, which were once extensive and productive, have been given up, from the impossibility of obtaining women, who were either willing or capable of drawing the milk, or manufacturing it after it was drawn. Indeed, in the progress of refinement, fast spreading itself through the country, our young men and women are beginning to look upon a cow, as a non-descript animal, escaped from some strolling menagerie, and the very odor of the barn, is likely to throw them into hysterics ; while, to the same delicate class, the fumes of segars in volumes thick enough to cloud the sight, or the mephitic vapors of a crowded theatre, or ball-room, or the exquisite odors of a broken gas-pipe, are inhaled as nectar.

There is one condition, however, in which it must be admitted, that manufacturing pursuits and trading pursuits, benefit agriculture, and serve reciprocally to assist each other. Of this almost enviable condition of life New England presents many beautiful examples. I mean, especially, when a small farm is united with some mechanical trade, which may be prosecuted both by male and female hands at home. Thus, in such cases, the summer is spent in the healthful and delightful labors of the open air and fields ; and the rainy days, and the winter months, are occupied in mechanical employments within doors. Thus the farm furnishes all the delicious luxuries of the domestic establishment ; and the proceeds of the trade, besides assisting in the progressive improvement of the farm, afford the means of embellishing the domicile, and rendering the

home more delightful ; and likewise the means of purchasing books, and providing for the improved education of children, and of placing some little fund in reserve, for the cloudy days of sickness, accident, or old age. It is equally delightful, when agricultural pursuits are made the accompaniment of business and commerce ; when, after a reasonable time spent in the cares of the counting house, and the perplexing excitements of the exchange, the merchant retires to his delightful villa in the vicinity, feeling like a man just born into the world, when he breathes the fresh and balmy air of the country ; and in all the delicious consciousness of freedom and repose, surrenders himself, like the imprisoned bird escaped to his native woods, to the pleasures of domestic and rural life.

Another circumstance of the times must prove favorable to the progress of agriculture. I refer, particularly, to the spirit of inquiry which is generally awakened, and especially to the attention given to natural science. The institution of geological and botanical surveys throughout the country, inquiries directed to the natural history of birds, insects, and animals of every description, the investigations and experiments of chemistry, the encouragement of agricultural journals and papers, agricultural societies and shows, and especially, the liberal encouragement given by some States to agricultural societies and in offering bounties upon wheat, silk, and sugar, the readiness of our citizens, especially that enterprising class who visit foreign countries, to bring home such seeds or plants, as it may be possible to naturalize here, and the interest, which the most gifted and cultivated minds in our community are taking in this subject, this most important of our political interests, are all urging it on with an impulse, which must be productive of the best results.

The prejudice, which has been entertained against book-farming, or rather scientific researches serving to assist this great art, is fast dying away ; and an intelligent man now in any condition of life would be ashamed to acknowledge it. The improvements, which have taken place in any of the arts,

have not been made by blockheads, and men who gloried in their ignorance, but by men of active and cultivated minds. It would, indeed, be strange, if agriculture, the most beautiful of all arts, and that which, in a degree, combines and demands the aid of all, should be considered as the only one where science and knowledge avail nothing ; where blind physical force is to accomplish every thing ; and where mind, the glory of man, the great arranging, controlling and moving power of the universe, from which, all order, and beauty, and success, and life itself spring, should here be powerless. If this, indeed, be so, we may as well fold our hands, and leave the management of our farms to our cattle. When men, therefore, rail against science in agriculture and book-farming, we may say to them, if in truth they deserve any notice, that the present improved form of the plough, so light in its draft, and so beautiful in its operations, is the result of many scientific experiments and profound mathematical inquiry ; and if, instead of the capital instrument of Wood, or of Small, they would prefer the Chinese spoon, made of a single piece of flattened iron, with a single handle to be held by both hands, and a man always to ride astride the beam, we cannot admire their sagacity.

But I pass on to answer the next question, can agriculture be made profitable among us ?

To this, I answer unequivocally, and emphatically, in the affirmative. It is profitable, as it is now conducted, in the niggardly manner in which it is carried on in most parts of New England. If we would but do it even half justice, its profits might be vastly increased.

I venture the assertion, that there can scarcely be found an instance in New England, in which a farm has been cultivated with persevering industry, and the whole management has proceeded with strict temperance and frugality, and no extraordinary calamity has befallen the farmer, where he has not only supported his family in comfort, but has failed to accumulate a respectable competence for his advanced age.

If we compare agriculture with other professions, it presents

no examples of extraordinary wealth ; and its moderate gains are generally regarded with disdain. But we may, in this matter, be deceived. A great show of wealth and luxury has often an insubstantial basis to rest upon. The embossed covers and gilded leaves, give no certain indication of the contents of a book. It is, indeed, with the condition of many men, as with some men's libraries ; many a gilded folio, is only a show case ; and some magnificent title of history or philosophy is only the covering of a backgammon-box. The commercial changes and fluctuations of the last few years show the extreme uncertainties and perils, which surround the trading community. It is a fact as instructive as it is melancholy, that of the traders and merchants throughout the country, more than three-fourths become bankrupt or die insolvent. The manufacturers, with all the show of success, have not always been more fortunate. A highly intelligent manufacturer gave it to me as his opinion, that if we date from their foundation, there are comparatively few manufacturing establishments in the country, which have not proved losing concerns. Of the herd of speculators, as great a curse to the country, as the locusts of Egypt, which infested the whole land three years since like grasshoppers, what has become of their golden illusions ? vanished alas ! like the gilded clouds of sunset ; and, most of these mad men, like insects round an evening bon-fire, have either perished in the flames, or escaped, maimed and incurably crippled for life.

It is only when industry and frugality are abandoned, and the farmer quits the sober pursuits of his proper calling, for the hazards of speculation, or the estate runs out at the spigot of the rum-barrel, or the children, disdaining the humble occupations of the parent, take advantage of his kindness, and fatally entangle him in the miserable results of their idleness and extravagance, that the farmer becomes involved in insolvency and bankruptcy.

If, as I have said, in our imperfect modes of husbandry, agriculture affords a fair compensation to labor, and lays the foundation of respectable and moderate competence, much more might

be expected from it, when pursued in a more enterprising and liberal manner. Perhaps I should explain myself. Throughout New England then, the first inquiry of a farmer usually is, with how little labor can I get along? and how shall I keep my expenditures within the least possible limits? If the same rule were adopted in trade, or in manufactures, nothing could ever be effected to advantage. If labor and capital, can be applied to profit in agriculture, then apply as much of them as you can possibly command and use to advantage. The rule is a sound one, to cultivate a little land well, rather than to cultivate a good deal poorly; but if farming is to be made profitable in the common business-acceptation of that term, then we say, cultivate all the land well, that you can cultivate well; and always governed by the rules of sound discretion, expend freely all the capital and the labor, of which you can see the prospect of a favorable return.

In this respect, New England farming is far from what it should be. At fifty bushels to the acre, Indian corn is one of the most profitable crops, which can be grown. Good husbandry ought to produce this. The fodder from such a crop, when well cured, may be considered as of equal value with the crop of hay, which might ordinarily be obtained from the same land. This product is one with which we are familiar; and to which our climate is congenial; and yet the fact is as undoubted, as in my opinion it is disgraceful, that New England does not produce over its whole territory, even half a peck of Indian corn to an acre. The flat corn of the South, is carried by thousands of bushels, even sixty miles into the interior. This fact should be proclaimed in every village throughout the land, until we disdain a dependance upon others for that, which, at an ample profit, we might produce ourselves;—and if, in truth, the pecuniary profit be small, the moral profit would be incalculable.

We have a great deal of land in New England, which can be made to produce fifty bushels of corn to an acre, and other crops in proportion. But it will be said, that our farmers cannot afford to cultivate their land in a way to produce such crops.

The only answer to be given in the case is, that the best is always the cheapest cultivation. The expense of cultivation is not always in proportion to the amount of crop. It is obvious, that in many cases, a few bushels in the yield, may constitute all the profits of the crop. An acre of corn, for example, yielding only thirty bushels, may barely meet the expenses of cultivation. But, if made to produce forty or fifty bushels, there will be a considerable profit. In this case, the rent of land is the same ; the ploughing, planting, and cultivation the same, and the only difference in the expense, may be an increase of seed and of manure, which is a small matter compared with the increase of the crop.

My last topic is, what branches of agriculture can be most profitably pursued in New England. I cannot go largely into this subject ; for carry as large a swarth as I could swing, I could not even mow once half round the field. The simple answer to be given is, that with good husbandry, we may raise, with a fair profit, of whatever the climate will produce, every thing which we need to eat, drink, or wear. The first of all rules in domestic economy, as far as the actual wants of his family are concerned, is for the farmer never to go abroad for what he can produce at home. There may be exceptions to this rule among those who reside near the capital, and who are rather gardeners than farmers ; but there is no exception with respect to those who dwell in the interior. Beyond this, the farmer must select the objects of his cultivation, with a particular reference to his location, soil, aspect, climate, the facility or difficulty of procuring labor ; and especially the market, and the demand. He should have some reference likewise, to the permanency or the perishable nature of the crops or products which he raises. In the former respect, Indian corn yields to none other. I have in my possession, an ear of corn grown in the year of the total eclipse, 1806, as sound and perfect, as the day on which it was gathered.

With these few remarks, I pass on at once to the consideration of some new or unusual crops, the introduction of which,

into the country, is begun, and their extension contemplated. I refer to silk, and to beet sugar. The country has, in every part of it, been agitated and inflamed with an extravagance of speculation in mulberry trees, which has never been transcended, nor scarcely rivalled in any age or country.

This extraordinary excitement has had two valuable results—the first, that of directing the public mind with intense force to this great article of domestic industry and national wealth; the second, that of introducing into the country a plant, whose intrinsic value, considered in itself, can scarcely be overestimated. This plant, as in the common oscillations of human caprice, is as likely to be as much undervalued as it has been before overestimated. It will presently find its true level; and the persons, who have introduced and cultivated it, will be honored as distinguished benefactors of the country.

From the most diligent and extensive inquiry I have become convinced that raw silk may be made a profitable article of cultivation in New England. I indulge in no dreams respecting it. The public have been deceived with representations in this matter, whose extravagance could not be exceeded, except by the diseased credulity which eagerly drank them in. You would have supposed indeed, from the representations spread before the public, that it was only necessary to plant a cutting of *Multicaulis* one day, in order to find it on the next day transformed into a tree with the silk stockings and figured ribbons pendant from its branches. Whether men will ever grow wiser or not, I presume not to predict. Experience, though often a severe, seems a very inefficient instructor. But the days of this delusion are ended. Let us come to established facts.

The *Morus Multicaulis* is a tree well adapted for the production of silk. It has not been found to endure our winters, though this is not without remarkable exceptions; and a strong confidence is entertained, that by selecting a favorable situation, where the frost holds on late and the spring vegetation is not accelerated, their security may be attained. But the taking

up the trees in the autumn and replanting them in the spring, or rather laying them down in the furrow, is not a severe labor ;—and this extra trouble finds some compensation in the extraordinary increase of the plant managed in this way—and the facility with which leaves may be gathered from trees thus trained in a hedge form. Multicaulis trees grown from seed, though their foliage is not equal in size to the original, have furnished selections of a hardiness, which has withstood our severest winters. We have other hardy varieties, which promise all we desire. The common white mulberry is as much improved by selection and engrafting as any class of plants, submitted to that process.

It has been proved that the *Morus Multicaulis* and the Canton Mulberry may be set out in the spring, and raw silk produced from them the same season, at the rate of fifty pounds per acre ; and at current prices of labor, at an expense not exceeding three dollars per pound. Having treated this subject at large in my Third Report of the Agriculture of Massachusetts, I shall not now pursue it. But at current prices, or even at a considerable reduction from present prices, this would yield a large net profit per acre.

The expense of fixtures is small. The management of the business is simple and intelligible, though experience and care are requisite to success as in all other cases. It is not liable to more accidents than many agricultural operations ; and the greater part of the labor required may be of a kind scarcely available in other departments. When we consider the number of old people who can do but little, of children whose labor it is difficult to apply to advantage, of indigent females who need some means of support, and of young women, who are induced to seek employment in cities, and too often perish in these maelstroms of profligacy, but who would gladly, if profitable employment could be found, remain under the protection of the parental roof, we may regard the silk culture as a resource in every aspect desirable and gratifying to the virtuous and philanthropic. The improvements in the manufacture

of cotton and wool by water power and machinery, have banished from our farm houses the ancient habits of household industry for our women. This will reinstate them, and bids fair, therefore to prove a great boon.

I pass on to sugar from beets. The improvements in France within even the last year, in the manufacture of this product, have surprised its most sanguine friends. They have effected four great objects—first, to obtain a much larger per centage of sugar; they now get eight per cent. of sugar from the raw material; and second, greatly to reduce the expense; thirdly, in removing the mucilage, which gave an offensive taste to the new sugar; and fourthly, in shortening the time of the operation, so that the whole process, from taking the beet from the field and obtaining a finely crystallized sugar, may be accomplished in twenty-four hours. We may confidently look forward to the time when the farmers in New England, will be as able to supply themselves with this necessary luxury from their own farms, as they do now their own butter and cheese. The beet itself, if raised only for cattle, and especially for milch cows, is one of the best crops which can be grown.

In this connection, I will call your attention but to one other subject, which I deem of great and practical importance. The sugar maple deserves cultivation in every part of the State where it can be grown. As an ornamental tree, it is beautiful, hardy and healthful; and where the soil is favorable, there is, in my opinion, no illusion or romance, in believing that a great part of the towns in New England might, in less than half a century, have the means of a permanent supply of sugar from this source ample to meet their wants. There are several towns within my knowledge, which produce, annually, twenty thousand, several thirty thousand, and one forty thousand pounds of maple sugar, from trees planted, for the most part, within the memory of the generations now on the stage. The methods of making it are imperfect and slovenly; but it is capable of being manufactured and refined

into as beautiful an article of the kind, for use or commerce, as the market affords.

We have every reason to thank a kind Providence for the land of our birth, and to cherish and strengthen those bonds of affection which bind us to the place of our nativity. If its climate afford no perpetual summer, use reconciles and even attaches us to its changing seasons ; and to the reflecting mind, the generous, intelligent, and pious student of nature, even stern winter is not barren of objects, in the highest degree picturesque, beautiful, sublime, and elevating. If its soil is hard, and it requires a bold heart to contend with the difficulties which lie in our way, the efforts which are necessarily called out invigorate the physical frame, and give energy and elasticity to the mind.

There is no ground to complain of the place where Divine Providence has cast our lot. Let us regard it as the highest duty of patriotism, philanthropy and religion, to bring each one his humble but hearty contribution to the general stock of good ; and to labor in his vocation, to do what he can and all he can, to improve, elevate, enrich, embellish, and make happy the community in which he lives.

AN ADDRESS

DELIVERED AT HARTFORD, CT.

BEFORE THE

HARTFORD COUNTY AGRICULTURAL SOCIETY,

7th NOVEMBER, 1840.

HAVING had the honor of twice addressing the farmers of Connecticut within the last few weeks, it may savor of presumption, that I should again present myself among you. I offer only two grounds of apology ; these, I trust, your candor will accept ;—the first, my deep interest in agricultural improvement, which strongly inclines me to render services, which others may deem useful ; the second, a desire to cultivate that spirit of fraternity in which the members of this great confederacy should live together as one family ; and in the interchange of those friendly sympathies and offices, which will keep the golden chain of union bright and unbroken.

I shall indulge in no general eulogy upon agriculture, but shall consider the present state of the art among us ; the improvements practicable, and desirable ; and the means likely to effect them.

The agriculture of a country, yields in importance to no one of its great interests. I do not compare it with the intellectual and moral improvement of a community ; yet it has an intimate relation with these interests ; and is essential to *their* prosperity. The industry of a country, is the source of its

wealth ; and its application to the cultivation of the earth, is dictated alike by man's necessities, comfort, and happiness. Agricultural labor is not an evil. Physical exertion, under those reasonable conditions, which apply to every exercise of the animal and mental functions, is an absolute condition of health of body and vigor of mind. Human nature demands continually the whip of necessity to stimulate its exertions. In tropical regions, or where men subsist on the spontaneous productions of the soil, the race is always found in a condition of inferiority ; and commonly sunk in sensuality. The animal extinguishes the intellectual ; and men give themselves up to the lowest purposes of their being. In the elysian regions of a vertical sun, the vegetable products develop themselves with an extraordinary magnificence and splendor. But

" Man is the nobler growth our realms supply,
And souls are ripened in a northern sky."

It is an occasion of gratitude, therefore, that divine Providence has planted us where the necessity of personal exertion is absolute. The legacy left us, is that which the fable represents the old man bequeathing to his sons, a treasure buried in the field, sure, but only to be found by digging for it.

New England enjoys peculiar advantages for the encouragement of industry. Her sea-coast, stretching along the whole of her southern boundary, an extent of more than seven hundred miles, presents secure and capacious harbors ; and invites to a maritime enterprise, which has never been surpassed, and has created a marine second only to the commerce of the largest maritime power known in the history of the world. Her fisheries and lumber trade are immense interests. Her ships, like sea-birds, swim in every bay and inlet, which enterprise can penetrate ; and her adventurous mariners, in their chase of the monsters of the deep, double the stormy capes, and explore the wilderness of the Pacific ocean to recover the harpoons, with which they fleshed them in the North Atlantic.

In the facilities for manufacturing industry New England is unsurpassed. Her maritime condition enables her, at a mod-

erate expense, to command the mineral treasures of other lands; but, better than all this, she has a cheaper, a permanent and an inexhaustible power in her numerous streams and water-falls. Your own beautiful Connecticut, whose rich and magnificent valley I have explored, with a pleasure increasing at every step, from its opening at the ocean's side, to its distant and secluded retreats among the mountains, every where abounds with valuable water-powers. These will presently be reached by that equalizer of local advantages, that truly democratic abolisher of all monopolies, the steam chariot of fire with its flying wheels and its blazing train.

More than two-thirds of her population are subsisted upon her agricultural productions. Her soil is capable of supporting in abundance a population quadruple of that which she now has. Her exports of agricultural produce are small. They fall far short of her imports. But under an improved husbandry, her capacity not only of meeting her own necessities, but of becoming an exporter of agricultural produce, cannot be questioned. Who would have supposed six years since, that Maine, besides a vast amount of Indian corn, would produce eight hundred thousand bushels of wheat in a single year; and, who now, can doubt her capacity, with proper enterprise, to treble that amount?

Manufactures and commerce, are matters of exact statistical returns. It is not so with agriculture, excepting where there is some great staple production. The amount would vastly exceed any probable estimate, which could be formed of it, if we had any certain means of approaching this amount.

A statistical writer of high authority, asserts that the value of the manure annually applied in the cultivation of Great Britain, at current prices, much exceeds the whole amount of their vast foreign trade.* What, under these circumstances, must be the value of the crops? The same writer estimates the annual agricultural produce of Great Britain and Ireland,

* McQueen.

at £474,029,688 stg., and the value of the agricultural produce consumed as food by the population of Great Britain and Ireland, as £295,479,166 stg., and the annual consumption of London alone, of agricultural and manufactured productions, at not less than £80,000,000 stg. These statements illustrate the magnitude of an interest which is much greater than is generally apprehended.

Let us take some other facts. The imports of flour into Boston, in one year, were 418,000 barrels ; and of corn, and other bread-stuffs, the same year, 2 million bushels. In 1839, the import of flour into Boston, was 449,068 barrels, and of corn, 1,607,492 bushels. Now, if we suppose, that one-third of her population are producers of their own bread, yet there will remain an annual expenditure of bread-stuff for the State, of about 9 million of dollars. If we take the city of New York, with a population of 350,000 inhabitants, including strangers, and allow them, upon an average, half a pound of meat per day, if in beef, at 700 lbs. to an ox, excluding the hide and tallow, it would require 250 oxen per day, or 91,250 oxen per year, to supply this amount ; and allowing each inhabitant one pound of bread per day, it would require a daily supply of 1750 barrels, and an annual supply of 628,750 barrels of flour. The value of this interest exceeds any other, may I not say, all others. But commerce and manufactures are themselves directly concerned in, and sustained by, the products of agriculture. It is the great and universal interest of the country.

The present condition of agriculture in New England is a subject of congratulation. Fifty years ago, in proportion to the amount of population, perhaps a larger number of persons were engaged in the cultivation of the earth than at any subsequent period. The various manufacturing establishments in the country have withdrawn many hands from the pursuits of husbandry. But at no period has the subject of agriculture been more highly appreciated, or a more enlightened and active spirit of improvement prevailed, than at the present time.

Agriculture in New England is, however, far from being what it should be. There prevails in the country a universal appearance of comfort ; but a vast extent of territory, capable of being rendered highly productive, remains uncultivated. New England should produce all she can produce to advantage. She can always produce to advantage when the labor employed receives as fair a compensation as is received in other departments of industry ; and especially where, in cases which are not infrequent, that labor is used which otherwise would be unavailable. Let me illustrate this subject of unavailable labor. There is more or less labor in every family which cannot of itself find employment ; but for which employment must be found. If this is not done, it must be lost. The employments, which used to be universal in country families, of spinning, knitting, and weaving, are now abandoned for the reason always given, that the goods can be bought for a less price than it will cost to make them ; and that a pair of stockings, for example, can be purchased at the village or the city store for half the expense of the wool and the knitting. This, in my humble opinion, introduces a false principle and practice in domestic economy. If the labor, which would otherwise be employed in spinning, knitting, and weaving, is applied in a more agreeable and more profitable way, so as to furnish the means of purchasing the family hosiery and cloth, it may, in such cases, be well so to apply it ; but if otherwise this labor must be lost, or spent upon matters of trifling or of no importance, a continual drain is made upon the estate and habits engendered, which are fatal to all thrift. In a family hive there should be no drones ; all should be working bees. We must allow to advanced age the full measure of repose, which its infirmities demand. Childhood and youth must have time and opportunity for innocent and healthful pastime. The young of all animals require sportive recreation ; and it would be ungracious to fetter the lambs, lest they should skip and play. But of all education physical labor should constitute a part. Habits of useful industry, by which I mean of work, cannot

be too early formed, either for health or morals. The proud consciousness of self-dependence and a capacity to supply our own necessities is a noble element of character. The satisfaction of wearing and living upon the products of our own industry and skill is equally delicious and honorable.

At present, agricultural labor is as well paid as any kind of labor of the same description ; perhaps, all circumstances considered, better than any other excepting where an expensive profession or trade has been learned. As agricultural labor is well paid by those who hire, so also capital expended either in the form of labor, manure, redeeming land and making the waste places productive, in general, gives as fair and ample a return as other branches of art and business. I except, of course, all gambling speculations ; all operations in which chance is intermingled ; or where indeed success or ill success depends upon cunning or overreaching. I except, likewise, all expenditures for unproductive improvements, such as embellishments of every description ; buildings larger and more expensive than the necessities of the case require ; fences more expensive and built in a more permanent manner, and consequently more costly than are needed ; and a variety of other things, which will at once suggest themselves to observing minds. There is no ground to expect, nor reason in expecting, that capital expended in these matters should make any return, excepting as it may add to the intrinsic value of the property or the gratification of the taste or the honest pride of the proprietor. If a man chooses to have gilt instead of horn-buttons to his coat, and a silk velvet collar and cuffs instead of plain cloth, the warmth of the garment is not increased, nor are its durability and its uses extended. His taste may be gratified by these embellishments ; and, if he is in the matrimonial market, he may under some circumstances be what is termed a more fortunate man than he would otherwise be ; but he must not charge these extraordinary expenses to the necessities of the case. So, likewise, in fencing a farm, if the proprietor breaks it up into smaller enclosures than profit demands, or

builds a wall which shall cost him six dollars a rod, when that, which might be built for one dollar a rod, would be equally effectual and permanent, it is not just to charge to the farm the unproductiveness of five sixths of this expenditure. But capital invested judiciously in rendering the land more productive, pays as fair a profit in New England as in almost any part of the country, and as in the ordinary forms of investment in which money can be placed. Few farmers, in looking over their farms of a hundred acres, may not find many an acre, which by a judicious improvement at the rate, we will suppose, of one hundred dollars per acre, may not be made to yield two and three tons of hay to the acre, where now the herbage is coarse and gives no valuable return. If this hay be worth ten dollars per ton, and if it be worth ten dollars in the market the farmer may consider it to be worth twelve dollars to be consumed on the farm, and the proceeds of half the crop be sufficient to get the crop and keep up the condition of the land, then ten dollars may be set down as the annual and permanent income of this acre of land. This income ought to satisfy a reasonable mind. There is one difference between the application of capital in productive agricultural improvements and in some other investments. In the application of capital to manufactures, for example, the whole profit is realized in the improved value of the raw material or the amount obtained from the sale of the article over its actual cost. Investments in buildings and machinery, in such cases, are always a deteriorating capital, because they wear out ; and require constant repairs. In the redemption of waste land, the improvement becomes permanent ; and under proper management will continue to be productive, furnishing in general from itself the means of maintaining and frequently of increasing its productiveness. Nature is always liberal and bountiful. To the cultivator, who performs his part well, her rewards are usually a hundred fold. Nature must not be importuned to do impossibilities. No reasonable man will think of this. She must not be urged to keep the tide always at flood ; she must not be asked to make

the water flow up hill ; and for our accommodation reverse the order of the seasons, so that those who are never in time, excepting at their meals and their beds, may put off their planting until mid-summer ; but she must be met at the time and place she herself appoints. She is absolute, but not capricious and despotic. She is resolute and determined ; but not churlish and obstinate. As most men find their wives, she can be "coaxed but not driven." If you say, she shall, why then she won't ; and if you compel her to go against her inclination by force, if the house does not become too warm to hold you, you will sooner or later be compelled to retreat from your position. All this is as it should be. If nature were not governed by fixed laws every thing would be thrown into confusion. Discretion, foresight, diligence, and perseverance would have no advantage over carelessness, improvidence and indolence. What a miserable creature man would be if he could always command, instead of being compelled to obey. Now his destiny is in his own power upon certain reasonable conditions ; these conditions are such as to excite him to diligence, prudence, exactness ; and to form his character to virtues of a much higher order.

New England, then, invites the attention of her children to the cultivation of her soil by motives of comfort and profit. With the exceptions of cotton, sugar, rice, hemp, and tobacco, there are few crops to which her soil and climate are not in some parts adapted ; and for the prosecution of the dairy husbandry, and the production of wool and silk, few parts of the world exceed her. It is her own fault if here she does not excel. Millions and millions of acres of her soil are now uncleared or comparatively waste ; and may be purchased from ten to thirty dollars per acre, which would yield to the judicious and enterprising farmer a return vastly beyond any thing to be obtained from the fertile lands in the far West, which are to be had at the government price. This point admits of demonstration, but the limits of the occasion do not allow me to go fully into it. I do not of course take into view the advance

in the value of the Western lands from enclosure, cultivation, and buildings.

We inquire, in the second place, what are the improvements to which the attention of our farmers should be directed.

Let us suppose a case where farming is pursued not as a mere pastime or recreation; not as a mere auxiliary to some other trade or profession; not with a view merely to a moderate or mean subsistence, and with a determination to avoid all labor and expenditures, which can possibly be escaped; not without capital or credit; but a case in which agriculture becomes a trade or profession, and the object as in other professions is to render it as productive and profitable as it can be made. We suppose, too, that it has the same facilities of capital and credit at its command. New England presents few examples of an agriculture of this description; but to judge of the advantages of one profession in comparison with another, they must be viewed as standing upon the same level.

Under these circumstances, the first object of a farmer should be to make every part of his farm as productive as possible; provided always that any agricultural improvement, which he undertakes, affords reasonable expectation of profit. There are cases in which all attempts at improvement would be hopeless, and others in which the expense would never yield a compensatory return. Certainly I do not advise to any such experiments. But on the other hand many improvements might be made from which farmers now shrink back because of expenditures which they would involve, which would prove highly profitable. Look over your farms then; see what parts of them can be subdued, renovated, drained, improved and made productive. Begin with those which are nearest home, for the obvious reasons that you can apply your labor to *them* to most advantage. Let me add, do whatever you do in the most thorough manner. Men often fail in their expectations of good results from the imperfect, slovenly, or inefficient manner in which they execute improvements. No efficient improvement can be made, for example, in wet lands without a thorough draining. Men attempt, for instance, the recovery of

wet lands by the application of sand or gravel on the surface. The experiment seems at first successful; but the aquatic grasses presently make their appearance again and the expense and trouble are lost. Now no permanent improvement can be expected in wet lands, until the water is removed, or brought entirely under our command. In Scotland, the subsoil ploughing is operating extraordinary benefits; but in lands inclined to wetness it is found of no benefit until a thorough system of under-ground draining is introduced, and then its beneficial effects are wonderful.* The expenditure involved in such improvements is sometimes enormous, as we in our way of doing things would be likely to consider it; but the returns have been fully compensatory. In cases where the improvement has been only half-executed, where the subsoil ploughing has been done but the draining not attempted, it has resulted in disappointment and loss. Men complain in this case; but the result was to have been expected, and the failure is chargeable on themselves.

The second object to which the attention of our farmers should be directed, is the increase of their manure heaps, and of the means of enriching their lands. We have hardly begun to understand this subject, which is becoming one of the profound studies of chemical philosophy. In few things are our farmers more deficient, wasteful, and improvident, than in relation to manures; and I use this term in its largest sense. It is one of the most beautiful and wonderful arrangements of the Divine Providence, that every vegetable and animal substance in nature, every substance, susceptible of undergoing a putrefactive fermentation, is convertible into manure or a nutritious and enriching substance for the vegetable creation. Every thing that has had life goes to nourish and sustain life in some other form. Thus the system proceeds in one mysterious and eternal round of mutual subserviency.

Animal manures are deemed in general the most efficient; and every man and boy professes to understand their applica-

* See note, page 64.

tion. But it is obvious, these substances differ essentially in their composition. In the same races of animals their qualities must be essentially affected and modified by the food and condition of the animal ; and the form of their application, whether in a crude or digested state, whether in a green or fermented state, is a matter on which we need much farther light.

The use of hair, bristles, horn, bone, wool-waste, is of great importance. The use of various manufactured manures, such as pass through a process designed to divest them of every thing offensive, is a subject of important inquiry. The use of that most wonderful of all manures, gypsum, of wood and peat ashes, of potash, of lime, of salt, of salt-petre, of the nitrate of soda, of barilla, and a great variety of other matters, connected with this subject, all demand the attention of inquisitive farmers.

Two things are of great importance to farmers. The first is the collection, and saving, and effectual preservation of every substance, whatever, which can possibly be converted into manure ; pick it up as you would pick up money dropped in the streets, for it is, in truth, the gold dust of the farmers. The second is the examination of the whole subject by actual experiment. Make various, repeated, exact, and satisfactory experiments of different kinds and of every kind of manure within your reach, carefully noting every particular connected with it, such as the time and mode of its application, its quantity and form, the nature of the soil, the plants to which applied, and the results, if any, of its application. But you say, you cannot afford to try experiments ; you must leave that to the rich. My answer is, that no farmer is too poor to try experiments of this kind ; and they are among the most useful and instructive that can be made. If he cannot operate upon a large, let him operate upon a small scale ; if he cannot, for example, buy a cask let him try even a bushel of lime. A small experiment may be equally instructive as a large one. Experiments upon a small scale are likely to be observed with more exactness than those upon a large scale. What is mainly important is a rigid and exact

observation of the whole process in every particular, and a careful and impartial notice of the results. If you are afraid of being called an experimental farmer, if after having done your best you think you should be ashamed to acknowledge that you have failed or were in error, if you can do no better than sneer at what are called book-farmers, men who are making it the business of their lives to study and record the phenomena of nature, and thence learn her laws, if you have not the spirit and industry and inquisitiveness to ascertain whatever and all the truth which you can gather from your own observation and experience, then ask your wife to make these experiments, for I have no doubt she is much more of a man than you are.

The vegetable and animal creation are full of mysteries. Agriculture involves many of the most interesting truths of philosophy. Knowledge is power. Seek it with an enthusiasm which cannot be quenched. Press your inquiries into the deepest hiding-places of nature. Enter her noble temple that you may worship there. If the divine glory is not seen there, blazing between the cherubims as in the sanctuary of Israel, yet will you find it no idol's temple. Myriads of testimonials of the divine presence will disclose themselves to your enraptured vision; and serve to lift your adoring mind and your swelling heart to that divine agency, which beams with equal truth and power in the humblest plant that rises out of the ground, as in the brightest star that sparkles in the sky.

Pardon, my friends, the enthusiasm with which I speak; and let us proceed to other and every day matters.

The next subject of agricultural improvement, to which the attention of the farmers should be directed, is the improvement of their seed and their stock. I put these things together because there is an immediate analogy between them. The laws of nature are, that like produces like; that good and bad qualities are transmissible by natural descent; and that the tendency of defects, deformities, or bad properties of any description, where neglect prevails, and no pains are taken to

correct the evil, is always to propagate and extend themselves. This applies as strongly to plants as to animals. The indifference and neglect which farmers manifest in these matters are inexcusable. In truth, I have known farmers to change their sound and perfect wheat for that which is shrivelled, because it would produce more plants in number; and how few farmers are careful to go through their corn fields and select the earliest ripe, the soundest and the best formed ears for seed. How much more common is it to select in husking, or perhaps from the crib in the spring, and take such as chance may throw into your hands.

I might multiply facts to illustrate the error and evils of such neglect, and the advantages to be derived from extraordinary care and attention. A friend of mine, by great care in selecting the seed of his case-knife beans, actually forwarded the usual time of ripening the plant twenty-six days. In some very exact experiments made in Scotland, in the cultivation of wheat, the clear difference in the product between sowing shrivelled and imperfect, and sound and perfect seed, in the same field and the same season, was as $5\frac{1}{2}$ to 15. These are extraordinary results, and show the importance of the most scrupulous attention.

With respect to the improvement of our live-stock, the subject assumes an equal importance. The introduction of the small boned, thrifty, always-fat, good-humored breed of swine,—an improvement which was begun by a Chinese cross as early as 1793, and has attained a high degree of perfection under the improved Berkshire,—instead of the long, gaunt, hungry, noisy, wolf species, which seemed direct descendants from those who perished in the sea, has been already worth millions and millions to the country.

The introduction of the fine-wooled sheep, which was commenced under the public spirit of a distinguished revolutionary patriot of your own State, has led to results of incalculable benefit to the whole country. I should enter into some statistical views of this subject; but I dare not trespass upon your indulgence.

Two modes of improvement, in respect to our live stock, now present themselves, of one of which every farmer who raises stock may avail himself, and many of both modes ; the one by selection, the other by importation. Any person, who will look at an animal of one of the most improved breeds of England, and compare with him the animals of the same species found in the yards of most of our farmers, will admire the extraordinary superiority of the improved over the common in size, weight, early maturity, thriftiness, symmetry and beauty, and will admire the wonderful results of skill in selection, a judicious combination of valuable points, and an intelligent and devoted perseverance, which must have encountered many disappointments and discouragements. He will be almost ready to admit the claims of a celebrated New England breeder, who in his enthusiasm professes his readiness to breed animals to order, black, white, red or pyebald, with long horns, short horns, or no horns, with white eye-brows or yellow eye-brows ; and whom I ventured to advise to try his hand at breeding a set of milch cows, to run in the road, with straps about their necks, and the owner's name in brass nails upon the leather.

I congratulate the Connecticut farmers on the fact, that in the pure Devon and the improved Durham short horns they have had, through the public spirit of some of their intelligent farmers, several of the very best animals of the best kinds known in Great Britain whose names stand high in the British herd book, or as I might say if in New Haven, are printed in capitals in the college catalogue. Any enterprising farmer, if so he chooses, may avail himself of the advantages of these importations in improving his own herds, if he finds evidence to satisfy him that their introduction would be an improvement.

The second mode of improvement, is that of selection from the best animals of native origin ; and by perseverance in this system of gradual amelioration, the farmer may at length rear a stock in his own yards, from resources within his own reach,

as much superior to any which he now has, as the polished marble column with its Corinthian capital is superior to the rude block of stone just taken from the quarry out of which it was formed ; or as the fairest rare-ripe, whose vermilion cheek has been laved in the warm sun-light, to the miserable green and bitter peach, never ripe until frost, and then so hard, that even a hungry pig would scarcely distinguish it from the pebbles among which it might chance to fall.

No reflecting or intelligent mind will suppose that such improvements in any race of animals can be effected in a short time or without great resolution, judgment, and pains-taking ; and it requires as much pains to maintain as to perfect the improvement. The improvements in Great Britain have been the work nearly of a century and are still going on. If these breeds satisfy us, and we should not be carried away by appearances but by actual inquiry and trial, what eminent advantages have we in thus being able to possess at once the fruits of so many years of toil, disappointment, and expense.

The next improvement, to which I wish the attention of the farmers of New England to be directed, is that of providing succulent vegetable food for the winter keep of their stock. Our cattle are in the barn almost six months in the year. To be kept during that whole time upon dry feed, and that not always of the best quality, and at the same time to be exposed in cold and comfortless stables, where the searching wind often piles the snow upon their backs, is subjecting them to a treatment, which is as inconsistent with humanity as it is with thrift. The result is what might be expected ; and there is nothing more striking nor more painful to a benevolent observer, than the withered, lean, lanthorn-visaged condition in which the stock of the farmers of New England generally come out in the spring. Even their milch cows, who pay for their keeping in the most honorable manner, and whom the farmer should as little think of stinting and half-starving as he would his children, since without them, he could not raise his children, are treated with a severity, which admits of no apology ;

and which is as inconsistent with the farmer's true interests, as with the dictates of common justice and mercy. If these poor things had any souls, I think nothing would more, or more justly terrify these inhuman farmers, than the ghosts of some of these abused animals, among the greatest benefactors, which Heaven has ever given to man in the form of a quadruped.

The raising of esculent vegetables for stock ought to be as much a part of the annual business of the farmer, let his stock be large or small, as the production of any other crop. He would surely find his account in it. Ruta-baga, beets, carrots, parsnips may be grown without difficulty ; and, in proportion to the value, at as reasonable an expense, as any other crops. One of the best farmers in Massachusetts, accustomed to raise one or two thousand bushels of vegetables per year for his stock, assures me that for horses in particular, wagon daily-worked horses, he would prefer one hundred bushels of oats and one hundred bushels of carrots to two hundred bushels of oats. This corresponds with the experience of another practical farmer in Great Britain, who kept eighty horses constantly at work in his coal mines. Now fifteen hundred bushels of beets, eight hundred bushels of ruta-baga, or of carrots per acre, are not extravagant products. What then must be the value of a crop of carrots upon an acre, which should be rated as equal to eight hundred bushels of oats ?

Our cattle can never be improved, they can never look well nor do well, until we adopt this mode of husbandry. The clean condition, in which such cultivation leaves the ground for grain, is a material consideration ; and especially the abundant contributions of the most valuable kind, which such crops make to the future means of enriching the soil, and increasing its products.

The last subject, to which I take the liberty of directing the attention of the farmers, is the introduction of new articles of culture. I must not enlarge upon this subject. I therefore confine myself to one single matter, that is the culture of silk. I have given no small attention to this subject as matter of

professional inquiry. I am satisfied, from the most abundant observations and facts, that the climate and soil of New England are in a large part in the highest degree favorable to its production ; that the Southern climates though more congenial to the product of some of the tender and prolific varieties of the mulberry, are not congenial to the health of the worm ; and that with us, as a collateral branch of husbandry and domestic industry, it will ultimately prove a source of immense profit and comfort to our farmers. We have yet much to learn in the conduct of the business ; but the skill and perseverance of New England, will presently make it plain and recommend the product and employment to many families, who, if it be not difficult to procure the necessaries, may in this way assure themselves also of the enjoyment of the innocent luxuries of life.

It has received an impetus under which it is sure to go forward. Failures may be expected to occur under the inexperience, which appertains to every new branch of business. Intelligence and care will conquer every discouragement. It is sure to answer the reasonable expectations of reasonable minds. In its connection with household industry and in reference to that domestic labor, which is not available in the general and severe employments of husbandry, and in its moral aspects, it seems destined to prove to New England a signal blessing.

There are other matters in respect to which it would have given me pleasure to have addressed the farmers of Connecticut ; but the time does not admit of it.

My earnest desire is to exalt the business and profession of a farmer to that rank in public estimation to which in my opinion it is entitled ; and that is, when pursued as it should be, second to none of the liberal or learned professions. If I have been thought to treat the subject mainly in a pecuniary light and with reference to pecuniary profit, it is not because I deem that its most important aspect. It would be idle to pretend that farming is a means of making money in the common acceptation of the term ; or that it presents any golden prospects to

a mind absorbed only with avarice. Such anticipations if they are sometimes fully realized, yet by many chances are liable to fail; and when reached, in few cases bring that substantial comfort and happiness, which they seem to promise.

I have not time to enter into a comparison of the different pursuits and professions in life. Of one thing no small observation of life has satisfied me, that agriculture judiciously pursued, with even a less application of mind and of toil than almost any of the mechanical, literary, or trading professions demand, is sure to afford, with far less risk, a competency and an independence. So many thousands of the beautiful examples of such results are scattered broadcast all over New England that I need refer only to your own observation for a confirmation of this subject.

New England, broken up and subdivided as it is, into innumerable small enclosures, presents few examples of farming on an extended scale. But while our more restricted farming is equally favorable on many accounts, as far as a comfortable living and a gradual improvement of our condition are concerned without any of the risks attending large establishments, it is more promotive of general industry. Above all, it secures the permanency of that true democratic equality of condition, which is the charm and honor and felicity of New England society. While this continues, there is not likely to grow up among us a class of laborers, and a class of lords or masters, separated by distinctions, which often lead to the abuse of power and selfish indulgence on the one side, and to ill-blood and degradation and the quenching of all honorable ambition on the other. If ever there was a condition on earth in which the best desires of philanthropy were realized in regard to equal rights and equal opportunities of rising in the world and making our situation what we desire it should be, that condition is to be found among the rural population of New England.

If we consider how vastly the rural classes excel all others, and how large a portion of our people must necessarily be occupied in agriculture, if we consider what enormous drains the

cities are continually making upon the country to supply the demands of trade, manufactures, and commerce, we must on every principle of patriotism and humanity perceive the immense importance of raising the condition and character of our rural population. Let men of education and distinction lend their aid and their personal presence and countenance to this great object by freely intermingling in the public holidays of the farmers ; by teaching their children to respect and honor the laborer and the art, from which they derive their support, their wealth, and their luxuries ; and by making it an object in the settlement of their families, to plant some of their children upon the soil. If a small portion of what the rich now throw away in useless and unoccupied buildings, in extravagant equipages, in amusements which corrupt both the mind and heart, and in luxuries which waste the energies of the constitution and make them the premature victims of disease or death, and too often tend to bring all these evils upon their children, were devoted to the cultivation and embellishments of a farm, where their children might be trained, at least a large portion of the year, to early hours and habits of labor and frugality, what an immense gain would follow to them and to the community !

At a late Cattle Show, held in Cambridge, England, in Sept. by the British Royal Society, an American plough was presented for exhibition and attracted great attention. But the circumstance which most attracted my attention in the account was, that the plough on this occasion, when put into the ground, was held, and said to be exceedingly well managed by the Duke of Richmond, one of the first peers of the realm. What a useful example does such conduct present ? How much more honorable and efficacious to good morals, than to win all the stakes at the New Market races, or to figure as grand master of the pageantry of a coronation ?

I congratulate the farmers of Connecticut upon the new interest, which is waking up in your favored Commonwealth in this great concern ; and on the patronage with which your Legislature seems disposed to forward your liberal purposes. Go

to them with the firmness and courage of poor Oliver Twist, and "ask for more." They may be surprised at your importunity, but the liberality of the State cannot be more wisely directed. It will be returned to them a hundred fold in the general improvement.

The farmers of New England have every reason to thank God for the condition in which they are placed. They need not sigh for more genial climes nor more fertile soils. These they cannot have without dreadful abatements of health and comfort. Of all the conditions on earth, which it has been my lot to see or to read of, I am bold to aver, that I know of none more favorable to health, competence, enjoyment, and intellectual and moral improvement, than that enjoyed by the rural population of New England. I despise the contempt with which some pretend to look down upon us; and the opprobrium which they have the impudence to cast upon our habits of thrift and frugality. I deem it my highest boast, that I am a New England man and a Yankee. I do not ask to have a living without labor. This would be asking for a curse instead of a blessing, and a boon for which I have no claim. I only ask that a living shall be secure to me with reasonable labor, and this New England in her various departments of industry promises to all her children.

Better than all this, more than any other community in our country, New England is one common brotherhood; linked together by a common sympathy, a common origin and the interchange of good offices. In our civil and religious blessings, where is a community more favored? Where are the means of education more extended; the institutions of religion better maintained; the public peace more quiet; the standard of morals higher; the course of justice more established; and the courtesies of life more freely rendered? Where is the spirit of inquiry and improvement more active, and Christian benevolence and philanthropy more prompt and diffusive?

From the beautiful prairies of the great Western valley, fertile as the banks of the Nile, and magnificent beyond descrip-

tion, I yet return to my native home in New England with all the warmth of a first love. Her secluded valleys, her verdant meadows, her rounded summits, her dense forests, her rocky mountains, her crystal lakes, her ocean-bound shores, her silver streams, her gushing springs are all charming to me. Here, too, my friends and brethren dwell. I am satisfied to live under her stormy skies; to encounter her bristling tempests; to dig in her hard soil; for the mind as well as the body is braced by the exposure and the toil. In the midst of what others deem evils, I see innumerable compensations for which I look in vain to other countries and climes apparently more favored. In whatever direction I turn my eyes, there is every where such an exuberance of blessings to those who will perform their duty, that it would be the height of ingratitude to complain, and the height of folly to abandon a certain good for that which is at best uncertain and doubtful. I cling to her with the warmest affection of a child; and having been so long sheltered and nourished by her never failing care and kindness, I ask only that I may find my last resting place in the lap which gave me birth.

[NOTE.]

SUB-SOIL PLOUGHING.

The subjoined minutes of evidence, taken before a Committee of the British Parliament respecting the subject of Sub-soil ploughing, are so important and interesting, that I here insert them. For fuller statements in the matter, the reader is respectfully referred to the Third Report of the Agriculture of Massachusetts.

H. C.

Evidence of JAMES SMITH, Esq., inventor of the Sub-soil Plough.

Chairman. You live at Deanston ?—Yes.

Where is that ?—In the western district of Perthshire in Scotland.

Do you occupy a considerable farm in that part of Scotland ?
About 200 acres.

Have you improved your farm lately ?—I have.

In what way ?—Chiefly by thorough draining and sub-soil ploughing.

What was the nature of the soil upon your farm ?—It was various ; there is some part of it rather light soil, some of it gravelly upon the edge of the river, and some lightish loam, with rather a tenacious bottom, and in other parts a stiff sandy clay.

Is it a stiff sub-soil ?—Some part of it very stiff.

And it was all subject very much to wet ?—The greater part of it was covered with rushes and bent before being drained.

Will you describe to the Committee your mode of draining ?
 —The principle upon which I drain is to put in drains frequently, so that there may be opportunities for the water to pass off, because I find that in our climate the chief injury arises from the water that falls from the heavens.

Are those drains placed up the furrows or across the land ?—
 They are placed in the same direction that the furrows were before, but I have now no furrows. I lay all my fields down without any furrows. I object to furrows, because water is allowed to collect in a body, and thereby ruins the soil.

The fact is, that those drains are so frequent, that they answer the purpose of furrows ? Yes ; they answer the purpose of furrows.

How far are they apart ?—Twenty-one feet, and two feet six inches deep to the bottom.

Do you drain with stones or with tiles ?—Chiefly with broken stones, because I have stones upon the land.

You spoke of sub-soil ploughing ; you are the inventor of a sub-soil plough ?—I am.

Do you use it after draining ?—After draining. I first take a grain crop, and then after the separation of that crop from the ground I sub-soil plough.

How far do you fill up the drain with stones ?—I put in 12 inches of stones, leaving 18 inches between the upper part of the drain and the surface of the soil, and then I cover them most carefully with very thin sods, overlapping at the joinings, because it is of the first importance to prevent the soil which has been recently removed from running into the drains. There are many drains destroyed by means of the soil getting in at the top.

The water comes in at the side of the drains ?—Yes, by fissures in the sub-soil.

Will you describe the operation of the sub-soil plough ?—I have got a plate of it here (*producing the same.*)* The princi-

* See First Report of Agriculture of Massachusetts, p. 1.

ple upon which I constructed that plough was this, that I saw it was of the greatest importance to break up the sub-soil, especially where it was tenacious. I saw that the common trench plough, when used to break up the sub-soil, at the same time turned over the recently moved sub-soil to mix with the surface soil, which induced a sort of partial sterility for a time. I then bethought me of having a plough that would move the sub-soil, still retaining the active soil upon the surface, and I considered how I should construct it to have the least draught, so that the horses might easily draw it, because I was aware that it would require considerable force. I therefore made the plough as thin as possible in its transverse section, and the share of the plough, which is usually made with a free point not touching upon the lower part of the plough, and I found it was apt in stony land to get knocked out of its place, and therefore I made a mortice in the sock, and inserted the point of the share in this mortice : then in order to move the sub-soil as much as possible, I placed an oblique spur upon the one side of the plough, which throws up the sub-soil after the furrow has been divided and breaks it, but does not throw it further up than the bottom of the furrow of the active soil.

Mr. Hadley. Does not the spur increase the draught?—It does not materially.

How many horses does it require to work that plough?—Generally four horses in ordinary sub-soils, but upon some it has been necessary to use eight horses.

How deep do you plough?—Sixteen inches from the surface.

Mr. Loch. What is the depth of the original furrow?—Six inches ; we first go on with the common plough and turn over a furrow of the depth of six or eight inches, and then the sub-soil plough goes and stirs up the bottom without bringing the soil further up than its original position, then when the common plough comes round again, it throws the active soil upon that part which has been sub-soiled.

Then the advantage of stirring up the sub-soil is that the water which falls gets down to the bottom of the second fur-

row so as to relieve the upper soil from the effects of the rain that falls?—Yes; *besides there is a constant operation of the air upon the sub-soil, which converts it into soil.*

Mr. Cayley. Is it with a view to draining principally?—With a view first to draining, and then to converting the sub-soil into a fit soil for growing plants.

It makes the soil more permeable?—Yes.

How long have you been doing this?—About twelve years.

In the first instance, if you were to turn up that sub-soil, it would not be a productive soil, and therefore you prepare it by this course for subsequent turning up when it is prepared?—Yes.

When you conceive it to have come into a proper state for vegetation, do you turn it up at once or gradually?—At once.

Do you find that the soil will be very productive the first year after it is turned up?—I find it so.

Do you stir it up with the old soil?—I sub-soil it only once. I then take a green crop, followed by a grain crop; then it lies three years in grass; and then after that, I take a crop of oats; and then after, I turn it up to the depth of sixteen inches.

Then it takes about three or four years to bring the sub-soil to a proper degree of preparation?—It does.

After the sub-soil has been brought into a proper degree of preparation for vegetation, have you ever tried the experiment of bringing in a certain proportion, say a fourth part of the sub-soil after it is prepared, into co-operation with the active soil?—I have, and it answers very well.

Do you consider that the bringing into play the whole of the sub-soil at once is a better thing and more productive than holding in reserve a portion of the sub-soil?—I think it is.

After turning up the sub-soil, how many years have you grown crops upon it?—My mode of cropping is a seven years' shift, and I have now four fields undergoing a second shift.

Have you had the experience of what the condition of the previous active soil becomes, from being in a state of rest for several years?—It is all mixed together.

Then the effect of your system is to produce a new soil instead of the old one?—Yes.

Mr. Denison. According to your plan, supposing you were not to have turned up any of this sub-soil, but merely to have had your sub-soil plough pass through it, and were to go on cultivating without any thing being turned up to the top, instead of producing sterility, would even that produce an improvement of the crop?—It would, and a continued improvement.

After getting upon land that has been sub-soil ploughed, and then ploughing it up again, do you find that the sub-soil continues friable?—I do, to the bottom.

With strong tenacious soils you do not find that it is run together again?—No.

Mr. Heathcote. You have no furrows, and you plough 16 inches deep in all parts of the farm?—Yes.

Do you find that the water stands at the bottom of the furrow any length of time before it gets into the drain?—I do not think it does, but I cannot see the bottom of the furrow.

When you turn it up how do you find it?—I find it particularly dry, and sometimes, where the land has been poached in consequence of taking off a green crop, still it is perfectly dry at the bottom of the furrow.

You do not find that the treading of horses has any effect upon it at that depth?—None whatever; the effect of the most thorough poaching does not go beyond six inches, and below that it is found quite dry.

Will this sub-soil ploughing apply to all species of soils?—I have never yet seen any soil that it would not apply to.

The most retentive stiff soil?—Yes; and the deep bog as well.

Mr. Denison. After breaking up the sub-soil, but without turning it up to the top, suppose the farmer was to continue to plough it seven or eight inches, in that case how long do you think the operation on the sub-soil would remain effectual, or how soon do you suppose it would run together again?—

I think it would never run together in a solid form, because, when it has been turned up there is a constant circulation of the water and the air, which prevents running together again ; and when soil is laid in a dry position and exposed to the atmosphere, it seems to get some sort of attractive quality ; if you look at any mould you will find that it is all in little globules, and those are gathered together in large masses, forming larger globules which keep the soil open.

Do you think that the mere operation of allowing water and air to pass among the soil at a considerable depth in the ground would, to a certain degree, produce that effect upon solid clay of converting it partially into soil ?—I think it would.

Mr. Loch. What was the nature of that soil which you said was covered with bent before you ploughed it up ?—A great part of it I did not think worth more than 5s. an acre.

In consequence of what you have done to it, what is it worth now ?—I consider that it is worth 2l. an acre to any farmer.

What was the course of cropping that you adopted in the improvement of land ?—At first I was rather undecided with regard to the rotation I should follow, till from observation I formed a judgment what was the best course. The mode of rotation I generally followed was this : I drain always, if possible, in the lay or grass, because by draining in the lay the work is more neatly done ; then having completed the drains, I take a crop of oats the next year. Upon the greater part of that farm I have been obliged to plough very shallow furrows for the first crop, because there was not more than three or four inches of soil that I dared turn up ; then I took a crop of oats, and upon some of the fields I had not more than from 24 to 30 bushels of oats. After the separation of that first crop from the ground, I applied the sub-soil plough. Then I gave it another ploughing, and had a green crop ; potatoes upon some parts, and turnips upon others.

Could you have attempted any of those crops previous to the sub-soil ploughing ?—Not to advantage.

How long had it been in grass before you turned it up?—Some of it 15 years.

What is the next crop after the turnips and potatoes?—I then lay down what I have had in potatoes with wheat; I sow wheat in the end of the season, as soon as I can get the potatoes up; what I have had in turnips I grow barley upon in the spring, and I sow grass seeds upon both.

You could not have attempted barley upon that soil before?—Not with any success, and not wheat, because the land was so full of moisture that it honey-combed by frost, and so threw out the plants. There was one field especially, after a very severe winter, and with a frost, there was sometimes a space of 20 or 30 square yards from which every plant or vegetable had been thrown, not a bit of grass remaining upon it.

After the wheat what do you take?—I sow grass and barley.

Do you cut the grass for hay?—Some; the other is pastured from the beginning.

What is the nature of the grass it produces?—Very good, and very heavy crops of hay; I have generally about 300 stone, which is about three tons per acre.

Do you think that any improvement is likely to be so valuable for general purposes as frequent draining and sub-soil ploughing for strong land?—None.

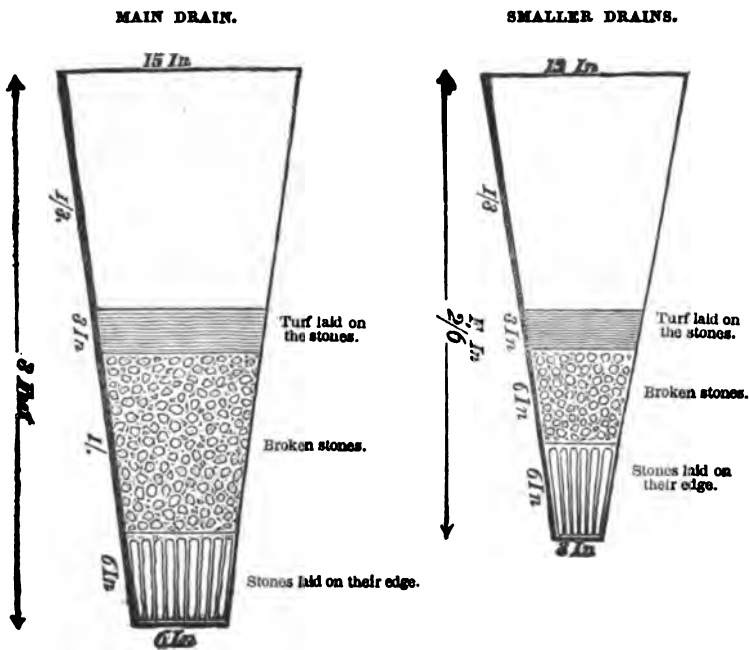
That, you think, is the most important thing for general purposes of farming that you are acquainted with?—Decidedly.

And applicable to more qualities of soil than any thing else?—Applicable, I should say, to all qualities of sub-soil.

And equally applicable to England as to Scotland?—Equally so, and very much wanted. I have a friend who has made an experiment under my directions in Cheshire, upon very stiff land, Mr. Barton; it is the most thorough brick clay I ever saw; an extremely sterile farm in its original state. Mr. Barton has been completely successful; he has thoroughly drained the ground and sub-soil ploughed, and it is now laid down without furrows, and I there saw a large field of this extremely stiff clay with a beautiful seed surface upon it.

Mr. Denison. Do you think that it is applicable to a soil where there is a bad gravelly sub-stratum?—I think so; I think any sub-stratum, if it is exposed to the atmosphere for a sufficient length of time, will become fertile. In the most barren country, if you see where a ditch has been dug, on the soil which has been thrown up you will generally find a richer verdure and strong weeds growing.

White's account of Draining, on Smith's plan.



The main or leading drains are cut 3 feet deep, 15 inches wide at the top, taper to 6 inches at the bottom, and filled up with stone from 15 to 18 inches. The smaller drains, leading into the main, are 2 feet 6 inches deep, 12 inches wide at the top, taper to 3 inches at the bottom, and filled with stone 13

inches, with turf upon the stone. The stone is first placed on edge, about 6 or 7 inches, and the remaining part covered with stone broken to $2\frac{1}{2}$ inches; a section of these drains is given—the drains are parallel to each other. The sub-soil varies much; the price for cutting the whole, breaking the stones, and filling, has invariably been 1*d.* per yard; some part has worked better than others, and, upon the whole, I think the work cannot be done for less. With regard to the distance between the drains, in this part, the work must be put out according to circumstances, which requires much attention, as great expense might unnecessarily be incurred, or the object fail. When the land is ready for the operation of the sub-soil plough, a man with a pair of horses turns out the first furrow from 10 to 12 inches wide; then follows the sub-soil plough to the depth of 14 inches, taking care not to stir the turf covering the stones in the drains; it is worked at right angles of the drains, and drawn by six horses, two and two abreast. The plough is drawn from an axletree, with double shafts and low wheels; the horses draw perfectly even, and by this mode it is no more than ordinary work.—*Journal of the Royal Agricultural Society*, 1839.



